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SUMMARY OF RECENT ABSTRACTS*

V. LEISHMANIASIS

Visceral Leishmaniasis

Epidemiology : Transmission : Aetiology

Fendall (p. 28) refers to a focus of kala azar recently reported in Kenya, and records other cases which have occurred there.

Kala azar and oriental sore (and also sandfly fever) are found in the Kohat-Hangu valley of Pakistan ; Qutub-Ud-Din (p. 496) gives an account of the sandflies caught there, the commonest being *Phlebotomus papatasi*.

Feng (p. 252) shows that in *Phlebotomus chinensis* and *P. mongolensis* a peritrophic membrane is laid down in the stomach round ingested blood. This membrane breaks down after a time in *P. chinensis* and the contained leishmaniae escape to the proventriculus and stomach, whereas in *P. mongolensis* the leishmaniae are confined in the membrane and are entirely excreted with the digested blood. Chung and Feng (p. 849) report an experiment in which wild *Phlebotomus chinensis* which had fed on infected dogs were kept for several days on a diet of apple or pear slices, and then permitted to feed on clean hamsters. Of 47 hamsters, 8 were found in this way to be infected, and the interval between the infecting feed and the transmitting feed varied from 3 to 15 days. These successful experiments were carried out in 1940–41 and were interrupted by the war.

Ansari and Faguih (p. 849) have devised 2 culture media of placental juice and placental broth respectively, in which leishmaniae grow abundantly. Sen Gupta *et al.* (p. 28) report electron and photomicrograph studies of the flagellate form of *L. donovani*.

Experimental infection of the cotton rat with *L. donovani* is relatively benign, similar to infection in the Chinese hamster. Fulton and Niven (p. 251) report a detailed study of the changes produced.

Pathology : Tests : Clinical Findings

Sen Gupta and Bhattacharyya (p. 608) discuss the pathology of the spleen in kala azar, on the basis of their findings in an early case and in later cases. In the early stages the vascular changes are minimal but there is

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1952, v. 49. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

considerable reticulo-endothelial activity, and mild leucopenia and anaemia. Later there is an increase of the vascular system and increased activity of macrophages, and at this stage there is evident hypersplenism which accounts for the anaemia, leucopenia and thrombocytopenia. In the very advanced stage hypersplenism is even more evident and the structural changes are extreme, and complete reversal may not be possible by treatment. Even though parasitic stimulus to macrophage proliferation disappears the vascular congestion remains, causing changes in the blood cells which stimulate phagocytosis, so that proliferation of the reticulo-endothelial tissue still continues, and a vicious circle is established, resulting in splenomegaly and anaemia.

Ranque *et al.* (p. 130) discuss the various diagnostic procedures in human and canine kala azar.

The cadmium test is performed by adding cadmium sulphate solution drop by drop to serum, and noting turbidity. Chaudhuri and Dutta (p. 253) found it positive in all the 126 cases of kala azar tested, but slightly positive results were also given occasionally in malaria and " splenomegaly ". Henry (A.F.X.) (p. 252) contends that a positive melanin flocculation test in a patient with kala azar is due to concomitant malaria.

A case of kala azar with an incubation period of 34 months is reported by Stone *et al.* (p. 851).

As a therapeutic measure Sen Gupta and Das Gupta (p. 130) have attempted to induce kala azar, by injection of culture flagellates, in a patient with leukaemia.

Treatment

Durand *et al.* (p. 253) report that 6 patients with kala azar, treated some years ago with Glucantime, have remained well, and they now describe good results in 4 others, and failures in 3.

Pentamidine isethionate was used in China by Lee and Ling (p. 29), given daily by the intramuscular route in doses of 3–5 mgm. per kgm. for 10–15 days. Some patients received more than one course. The results were good and the toxic reactions slight. Stilbamidine has been used in patients whose illness did not respond to antimony, or who were hypersensitive to antimony, by Chung *et al.* (p. 29). It was given intravenously in doses of 1–2 mgm. per kgm. to a total of 18·2–54·3 mgm. per kgm., or more in resistant cases. Results were usually good and toxic reactions mild and transient. It has been suggested that stilbamidine is stored for long periods in the body, and that this may account for the late toxic symptoms. Henry (A.J.) *et al.* (p. 851) show that it is absent from plasma and red cells at the end of a course of injections, and that its distribution in tissues varies widely in different animal species.

For evaluating drugs in kala azar, Soong and Ho (p. 761) inoculate Chinese hamsters with infective spleen material and begin treatment immediately, observing the effect on the development of infection. In this way pentostam and urea stibamine were shown to be effective, and neoarsphenamine ineffective. The same authors (p. 851) show that the toxicity of urea stibamine varies in different animals, and in different batches, and since pentostam is as effective as urea stibamine and more constant, they regard it as a better drug to be used as a standard for evaluation of other agents.

Cutaneous and American Leishmaniasis

A small outbreak of oriental sore in a European military garrison in Algeria is described by Malard (p. 852) ; *P. papatasi* is the usual vector in that area. Another small outbreak in the Western Sahara region is reported by Simonet (p. 852). In Algiers 6 species of *Phlebotomus* are found, and Parrot (p. 608) states that, of these, *P. perniciosus* and *P. longicuspis* can transmit

human and canine leishmaniasis, and that *P. sergenti* appears to be the most likely vector of oriental sore.

Cutaneous leishmaniasis occurs in the northern part of the French Cameroons, and seems to have a seasonal incidence in the rainy period. RAGEAU (p. 496) gives an account of the sandflies, and suggests that *P. roubaudi* is probably the only vector.

OBERLING and ANSARI (p. 679) describe the cultivation of *L. tropica* on the chorio-allantoic membrane of chick embryos. Growth depends on the temperature at which the eggs are kept ; it takes place at 25°C., at which, however, the embryo dies, and at 31° to 40°, but phagocytosis occurs and the flagellates disappear in 72 hours at 38·5–40°C., the histological picture being that of cutaneous leishmaniasis, with macrophages filled with leishmaniae.

A form of recurring cutaneous leishmaniasis has previously been described, and DOSTROVSKY *et al.* (p. 1104) now show that patients with this condition can be superinfected by intradermal injection of a culture of *L. tropica*. The lesions which develop resemble those of relapse, rather than initial lesions.

DE SAMPAIO (p. 382) traces the origin of cutaneous leishmaniasis in the State of São Paulo, where it was first seen in 1905 in men working on railway construction in wooded areas. In these areas *Phlebotomus* abounded, and various wild animals (tapir, cavy, coati, capybara etc.) were found infected. Infection is being reduced as the wooded areas are cleared, and preventive inoculation has been found a good protective measure. DEL PONTE (p. 761) discusses the epidemiology of cutaneous leishmaniasis in Argentina, naming some of the sandfly vectors, and some of the animal hosts. The persons attacked are chiefly those working near woods, which are the favourite haunts of the vectors. [In the original paper Del Ponte includes the Psychodid fly *Warileya phlebotomanica* under the general heading of vectors, but HERTIG (this *Bulletin*, 1949, v. 46, 407) who described the fly, and whom Del Ponte quotes, did not suggest that it was a vector.]

TREJOS and ECHANDI (p. 254) show that a culture of newly isolated *L. brasiliensis* can be pathogenic to man on intradermal inoculation, with production of typical lesions.

GUIMARÃES (p. 1105) has shown that *L. brasiliensis* can produce visceral infections in white mice, black mice and agouti mice after intraperitoneal or subcutaneous injection, but the lesions are not so extensive as in hamsters. No lesions were seen at the site of inoculation. The visceral lesions were indistinguishable from those attributed to *L. donovani*. Cotton rats showed only slight visceral infection. The same author (p. 1105) describes a new strain of *L. brasiliensis* which is unlike the others in that it failed to produce visceral lesions in hamsters, but did produce dermal tumours full of leishmaniae. On intraperitoneal injection, however, no skin lesions were produced, but the hamsters developed periorchitis. These differences suggest that this is a distinct variety of *L. brasiliensis*.

ROTBERG (p. 30) discusses the Montenegro reaction in which prepared suspensions of leptomonads of *L. brasiliensis* are injected intradermally in graded doses. In American leishmaniasis an early reaction (48–72 hours) is followed by a late reaction (3 weeks or so). The late reaction is probably distinct from the early reaction. The papule of the injection itself sometimes persists for several days in negative cases, and may give confusion with the early reaction, but the true reaction is usually larger and shows more inflammation. FASAL and GRADOW (p. 131) regard the Montenegro test as specific for leishmaniasis, but in American leishmaniasis positive results are given to preparations from *L. tropica* as well as *L. brasiliensis*, and the test cannot differentiate the various forms of leishmaniasis.

CORNEJO (p. 31) reports excellent results with Glucantime in 5 cases of American muco-cutaneous leishmaniasis. The usual intramuscular dose was 0·1 gm. Glucantime per kgm. daily for some 20 injections, and this may be repeated after an interval. *Charles Wilcocks*

MALARIA

O'ROURKE, F. J. **Malaria in Canada.** *Canadian J. Pub. Health.* 1953, Jan., v. 44, No. 1, 38.

Canadian servicemen returning from Korea might act as reservoirs of malaria parasites for indigenous anophelines in Canada. In 1944, it was shown that *Anopheles quadrimaculatus, A. freeborni, A. occidentalis, A. punctipennis* and *A. walkeri* occurred in Canada [this *Bulletin*, 1947, v. 44, 694]. Only the first two have been shown to be responsible for malaria transmission to man in North America. *A. quadrimaculatus* is found in the Southern fringe of Quebec and in Ontario from the Ottawa Valley southwards to Lake Erie. *A. freeborni* has been found in Canada only in British Columbia, and not in large numbers.

North of the 60°F. isotherm the parasite cannot develop to the infective stage as the extrinsic incubation period in the vector is so long. The possibility of autochthonous malaria occurring in Canada would thus appear to be greatest in southern Quebec and southern Ontario, though future endemicity is remote under present conditions : also remote is the chance that an overwintering *A. quadrimaculatus* might spread infection among occupants of a dwelling. If, however, several cases should occur in a neighbourhood, anopheline control should be undertaken and the cases promptly and adequately treated. The most that might be expected is perhaps the possibility of occasional sporadic cases, and in such circumstances there is very little danger of an outbreak following them. *H. J. O'D. Burke-Gaffney*

i. WOLFS, J. La faune culicidienne des forêts de bambous. [**Mosquito Fauna of the Bamboo Forests, Kivu**] *Ann. Soc. Belge de Méd. Trop.* 1952, Oct. 31, v. 32, No. 5, 529–30.

ii. ——. Note sur la faune culicidienne de Costermansville. [**Mosquito Fauna of Costermansville**] *Ibid.*, 531–7.

i. Under the first title the author lists the mosquitoes collected from July, 1951 in the bamboo forests situated at altitudes of between 2,000 and 2,500 metres (6,560 and 8,200 feet) on the slopes of the mountains of Kausi and Biega to the northwest of Costermansville in the district of Kivu, Belgian Congo.

The names are given of species of *Aëdes* (5), *Uranotaenia* (1), *Eretmapodites* (2), *Taeniorhynchus* (1), *Culex* (14), and *Anopheles* (2). The most common mosquito was *Culex albertianus*. *Anopheles garnhami walshi* is recorded for the first time for the Belgian Congo. Some atypical taxonomic details are noted in specimens of *Anopheles kingi, Culex vansomereni, Aëdes angustus* and *Aëdes bambusae.*

ii. The second paper contains lists of adults and larvae of species of *Anopheles* collected at Costermansville, Belgian Congo, each year from 1948 to 1951 together with some brief notes on breeding places. The species named are *A. pharoensis, demeilloni, gambiae, christyi, marshalli, funestus, coustani* and *coustani ziemanni*. *A. gambiae* is considered to be the local malaria vector.

A. pharoensis is absent from the lists for 1950 and 1951 although in 1948 a special survey was made at Bobandana because of an invasion of this mosquito. In that year a volcanic eruption caused lava to move into Lake Kivu and floating vegetation was concentrated at the end of the bay. Among this vegetation were thousands of larvae of *A. pharoensis* but none outside it. Mosquito larvae are not found in the Lake water in normal times and it is suggested that this absence is related to the *p*H of the water, which is influenced by the volcanic nature of the environment. An account is given of several small-scale laboratory experiments with *Culex pipiens* which tend to support this idea.

In addition to the anophelines 70 species of culicines are listed.

H. S. Leeson

See also p. 570, Gil Collado, Los anofelinos de Fernado Póo. [**Anophelines of Fernando Po**]

Chow, C. Y., Liang, K. C. & Pletsch, D. J. **Observations on Anopheline Populations in Human Dwellings in Southern Taiwan (Formosa).** *Indian J. Malariology.* 1951, Dec., v. 5, No. 4, 569–77, 5 figs. on 3 pls.

A survey in Southern Taiwan proved that houses were important daytime resting places of anopheline mosquitoes. Houses in rural areas of this part of Formosa are constructed of brick, bamboo and plaster, or bamboo and mud, and are arranged as distinct villages. Enclosures with water buffaloes, cows, pigs or poultry frequently adjoin the houses.

Mosquitoes were collected between September 22nd and October 2nd from houses selected at random in 3 different villages. Of 5 species of anophelines collected, only *A. minimus*, *A. ludlowi* and *A. hyrcanus* var. *sinensis* were found in significant numbers. The number of any one species relative to the total number of anophelines captured varied greatly in the 3 villages. Anophelines were taken most frequently in bedrooms, particularly under the bed platforms. Moderate numbers were found in sitting rooms, small numbers in store rooms, and mosquitoes were rare in kitchens, or under eaves.

The malaria incidence in the 3 villages was low, only 3 to 8 per cent. of the population being affected. Mosquitoes were dissected 5 to 7 days after capture. One of 965 females of *A. hyrcanus* var. *sinensis* dissected had an oöcyst in its gut ; 230 *A. minimus* and 66 *A. ludlowi* were all negative.

The authors suggest that preliminary trials in which the favourite resting places of the mosquitoes are treated with a residual insecticide would be valuable. It is not known whether the number of mosquitoes might be markedly reduced by such treatment, or the distribution altered.

C. M. Harrison

Montanari, A. Sulla comparsa nel sangue periferico di elementi di origine diretta connettivale, di linfoblasti e di elementi atipici nel paludismo estivo-autunnale di prima invasione. [**The Appearance of Connective Tissue Elements, Lymphoblasts and Atypical Elements in the Peripheral Blood during a Primary Attack of Subtertian Malaria**] *Riv. di Malariologia.* 1952, Dec., v. 31, Nos. 4/6, 153–6. English summary.

The author has selected 8 patients with first attacks of subtertian malaria with no previous history of disease. He obtained samples of peripheral blood in the initial stages of the fever and before there had been any specific treatment. He found " round " cells and plasma cells, " histoid monoblasts", " haemocytoblastic monoblasts ", lymphoblasts and the atypical forms of these which are known as Rieder cells. It is believed that the appearance of these elements

in the blood follows stimulation of the reticulo-endothelial system and the lymphoid tissue. Recent knowledge of the exo-erythrocytic development of the parasites (which the author accepts as taking place in the reticulo-endothelial system, without mention of liver cells) very soon after infection provides an adequate explanation for these findings, in his opinion. *J. Cauchi*

RAFFAELE, G. Inoculazione di sporozoiti e di sangue nella malarioterapia. [**Sporozoite and Blood Inoculations in Malariotherapy**] *Riv. di Parassit.* Rome. 1952, Jan., v. 13, No. 1, 77–82. English summary (6 lines).

Since the course of induced malaria, its tendency to relapse and its response to treatment vary according to the method of inoculation, the author has undertaken a comparative evaluation of infections produced by inoculation of sporozoites and by blood transmission of the 3 common species of parasites, based on the data collected by the Institute of Malariology in Rome in the course of malariotherapy of patients suffering from general paralysis of the insane.

In the case of induced benign tertian malaria, the incubation period after blood inoculation is usually 5–7 days, and after sporozoite inoculation on the average 14–15 days. If *Plasmodium vivax* is used for malariotherapy, blood inoculation is preferable, since treatment can be commenced earlier and the period in hospital of the patients is shorter. Moreover, the infection can be rapidly controlled by quinine, and relapses, which occur in the case of sporozoite-inoculated infections, are avoided.

Induced malignant tertian malaria was used only in patients immune to *P. vivax*. The incubation period of the blood-inoculated infection is on the average 5·7 days, that of sporozoite-induced about 10 days. In this form of induced malaria there is always the danger that the infection may assume a pernicious course. This is more liable to develop in patients inoculated with infected blood (about 80 per cent.) than in those inoculated with sporozoites (about 48 per cent.). On this account, for malariotherapy with *P. falciparum*, sporozoite inoculation is preferable, but the infection should not be allowed to result in more than 8 paroxysms, after which it is treated with mepacrine or chloroquine.

In the case of quartan induced malaria, the data on sporozoite-induced infection are scanty, but it would seem that the course of the infection and relapses after inoculation by both methods is similar. However, the incubation period after inoculation of sporozoites is longer (about one month) than after inoculation of blood (4–8 days). Though quartan malaria has a benign course, it is less suitable for malariotherapy than the other species, especially in old people, whose condition may deteriorate as the result of the prolonged period of treatment required when *P. malariae* is used. *C. A. Hoare*

SMITH, W. T. & LARSEN, E. **Simultaneous Perforated Appendicitis, Vivax Malaria, and Ascariasis.** *U.S. Armed Forces Med. J.* 1953, Feb., v. 4, No. 2, 309–10.

This note records the case of a young soldier in the U.S.A. recently returned from Korea who developed an acute abdominal condition necessitating operation. On the first day of the attack no malaria parasites were found and there was a moderate leucocytosis. The next morning signs of pelvic peritonitis were evident, the leucocyte count was 16,800 per cmm. and there were 81 neutrophiles per cent. The blood film now showed *P. vivax*. At operation a perforated gangrenous appendix was found.

Six hours after operation, the patient coughed up a specimen of *Ascaris lumbricoides*, 6 inches long. The patient received antibiotics, chloroquine and hexylresorcinol and made a good recovery. It is suggested that the appendicitis precipitated the malarial attack, but the ascariasis was incidental. The presence of malaria parasites should not be allowed to obscure an " acute surgical abdomen ". *H. J. O'D. Burke-Gaffney*

RAFFAELE, G. Le cycle exoérythrocytaire des plasmodies et ses rapports avec la thérapie du paludisme. [**The Exo-Erythrocytic Cycle of Plasmodia in Relation to the Treatment of Malaria**] *Riv. di Malariologia.* 1952, Dec., v. 31, Nos. 4/6, 135–43.

The discovery of the exo-erythrocytic phase of malaria parasites has made clear why neither quinine nor the synthetic anti-malarial drugs have any action on the unpigmented forms of the parasites developing in the tissue cells of the internal organs, and has explained the frequent failure of drugs in the prophylaxis of malaria and in the prevention of relapses.

There is no noticeable difference between the action of quinine, atebrin [mepacrine], paludrine [proguanil], chloroquine and probably camoquin on infections with *Plasmodium vivax* and *P. malariae*. All these drugs act as suppressives, but none has an action on exo-erythrocytic forms.

In *P. falciparum* infections, quinine often fails to effect radical cure and is not reliable in prophylaxis, while mepacrine, proguanil, chloroquine and possibly camoquin, administered in adequate dosage, are effective in both these respects.

It appears that proguanil is effective against primary exo-erythocytic forms (cryptozoites) and mepacrine against secondary exo-erythrocytic forms (metacryptozoites) of *P. falciparum*. Quinine does not seem to have any action on these forms, but is an effective suppressive of malignant tertian malaria.

[This view of the action of mepacrine is contrary to that of most other observers, who hold that the effect of this drug is to destroy the young asexual parasites after they have gained access to the blood.] *G. Covell*

BRUCE-CHWATT, L. J. & ARCHIBALD, H. M. **Field Trials of New Antimalarials in West Africa.** *Brit. Med. J.* 1953, Mar. 7, 539–41. [15 refs.]

One hundred and twenty African schoolchildren 5 to 10 years of age, all naturally infected with subclinical malaria, were divided into 5 groups.

Group 1 was subdivided into 2 halves, one of which received 0·75 gm. (3 tablets) of chloroquine sulphate in a single dose, the other 0·75 gm. in a single dose followed by 0·25 gm. on each of the 2 following days. In terms of chloroquine base the total dosage was 0·45 gm. and 0·75 gm. respectively.

Group 2 was also subdivided into 2 halves, one of which received a single dose of 25 mgm. (1 tablet) of pyrimethamine [Daraprim], the other 25 mgm. followed by the same dose on the following day.

Group 3 received 0·4 gm. (2 tablets) of camoquin in a single dose.

Group 4 received 0·2 gm. (2 tablets) of azacrin in a single dose followed by 0·1 gm. on each of the 2 following days. Azacrin is a new compound of the acridine series, having the formula 2-methoxy-6-chloro-9-(5′-diethylamino-2′ pentyl) amino-3-aza-acridine dihydrochloride.

The dosage of the 4 drugs tested was in each case half the usual adult dose.

Group 5 received no drug and was used as a control.

The blood of each child was examined on the first, second, third, fourth, seventh and tenth days after the first dose of the drug.

The comparative clearance time of trophozoites of *Plasmodium falciparum* (the predominant parasite) was : chloroquine (dosage I), $1·78 \pm 0·41$ days ;

chloroquine (dosage II), 1·95±0·39 days ; pyrimethamine (dosage I), 1·74± 0·26 days ; pyrimethamine (dosage II), 1·77±0·24 days ; camoquin, 1·69± 0·43 days ; azacrin, 1·58±0·42 days. Thus the clearance time was shortest with azacrin and camoquin, closely followed by pyrimethamine and chloroquine. None of the 4 drugs showed any direct gametocidal action. Chloroquine and camoquin appeared to have a more marked action on *P. malariae* than either of the other two drugs. It was concluded that all 4 drugs are good schizonticides.

As regards toxicity, there were no complaints of headache, nausea, or vomiting by any of the children who took pyrimethamine. Chloroquine was well tolerated, though 2 children complained of nausea after a single dose of 3 tablets. Four out of the 23 who received camoquin complained of headache and nausea after taking 2 tablets. Azacrin was well tolerated in a single dose of 2 tablets, but 3 tablets caused nausea, pain in the stomach and vomiting in 7 out of 10 children. It is emphasized, however, that some of the children had had little or no food in the morning when the drugs were administered and that the side-effects noted might have been less frequent had the drugs been given after a meal. *G. Covell*

Carrescia, P. M. Nota sulla terapia della malaria con la Nivaquine *B.* [**A Note on the Treatment of Malaria with Nivaquine B**] *Riv. di Malariologia.* 1952, Dec., v. 31, Nos. 4/6, 157–61, 5 graphs. English summary (1 line).

Nivaquine B [chloroquine] was given in an initial dose of 0·60 gm. followed by 0·30 gm. after 6–8 hours ; then 0·30 gm. on the second and third days, and in the case of quartan fever a similar dose on the fourth day. In all, 67 patients were treated, 64 were suffering from neurosyphilis and of these 50 had been inoculated with *P. vivax*, 13 with *P. malariae* and one with *P. falciparum*. The other 3 were cases of a spontaneous *P. vivax* infection. Some of these patients were found to be immune before any anti-malaria treatment was started. In the one case of subtertian malaria the trophozoites, but not the crescents, quickly disappeared from the peripheral blood. One of the patients died from bronchopneumonia.

Among 43 patients with benign tertian malaria, 93 per cent. had a normal temperature within 48 hours of starting treatment. Among 13 cases of quartan infections, nearly 77 per cent. were afebrile within 72 hours. Thick blood films were made daily and each was searched for parasites for 5 minutes at least. Among 45 cases of benign tertian infection, 93 per cent. showed no parasites after 72 hours' treatment. The blood was negative after 4 days' treatment in 10 cases of quartan infection.

The author is well satisfied with these results and considers that this drug has been thus shown to be superior to the acridine compounds in its action against malarial infection. *J. Cauchi*

Laufer, W. E. & Freedman, M. L. **Camoquin in Malaria.** *South African Med. J.* 1953, Jan. 31, v. 27, No. 5, 101–3.

Twenty-five Africans suffering from malaria (24 *P. falciparum*, 1 *P. vivax*) were treated with amodiaquine (Camoquin) at Francistown, Bechuanaland. Twenty-three of the subjects were adults, one a boy of 13 years and 2 were children of 18 months. The dosage for adults was 0·6 gm. (3 tablets) in a single dose ; the two younger children were given 0·2 gm. (1 tablet) each.

Twenty of the patients were cured after a single dose, and two others after a second dose, the majority being free from symptoms by the fourth day.

In 3 cases it was found necessary to give additional treatment with quinine, and these were classed as failures.

In a discussion as to the relative value of various drugs for the suppression of malaria, the authors stress that a different remedy should be used for treatment in the event of a break-through in order to minimize the risk of producing a resistant strain of parasite. *G. Covell*

CHAKRAVARTY, N. K. & CHAUDHURI, R. N. **Daraprim (B.W. 50–63) in Treatment of Malaria.** *J. Indian Med. Ass.* 1953, Jan., v. 22, No. 4, 155–8, 5 figs.

Sixty-two Indian patients suffering from malaria (26 *P. falciparum*, 34 *P. vivax* and 2 *P. malariae*) were treated with pyrimethamine (Daraprim). Most of the subjects were adult males, but 15 were children below 10 years of age. Two dosage régimes were used, the first a single dose of 50 mgm. (19 cases), the second 2 doses of 50 mgm. each given on consecutive days (43 cases). Children below 10 years of age received half the adult dose.

Pyrimethamine in this dosage terminated the clinical attack in four-fifths of the cases within 3 days, but proved slower in action than chloroquine and camoquin. Out of 26 *P. falciparum* cases, 10 (3 in the first group, 7 in the second) were regarded as failures; one did not respond, and the other 9 had a recrudescence of fever with parasitaemia within 1 to 2 weeks. Of the 34 *P. vivax* cases, 5 (2 in the first group, 3 in the second) relapsed within 12 days to 12 weeks after treatment.

The authors conclude that pyrimethamine is effective in *P. vivax* and *P. malariae* infections for the termination of the acute attack, though relapses may occur; but that in *P. falciparum* malaria it cannot "be regarded as a suitable form of treatment". *G. Covell*

JADIN, J. Rapport sur la campagne de dédétisation dans le territoire d'Astrida. [**Report on Malaria Control by DDT in the Astrida Region, Ruanda Urundi**] *Ann. Soc. Belge de Méd. Trop.* 1952, Oct. 31, v. 32, No. 5, 445–64, 6 diagrams.

The details of this campaign have been previously presented [this *Bulletin*, 1952, v. 49, 928] and a further progress report is here set out. Entomological examination suggests that DDT residual applications secure complete control for at least 5 months. Supplementary control by DDT larvicide has been tried and found to be ineffective in that there is no residual effect.

The chief vector is *Anopheles funestus* [this *Bulletin*, 1950, v. 47, 431] and it has completely disappeared in adult and larval forms from the areas where residual insecticide has been applied. *A. gambiae* continues to breed but in reduced numbers. The breeding of *A. christyi* and *A. squamosus* has not been interrupted.

The side effects of this work include a marked reduction in jiggers, fleas and lice, and a reduction in relapsing fever which might be due to the effect on lice or ticks. Cockroaches, however, have increased—a fact well noted by the inhabitants.

Parasite rates are presented, analysed by age-groups and places for both treated and untreated areas. In the treated areas the rate has dropped from 51 per cent. to 6·7 per cent., and in the untreated it has increased from 55 per cent. to 70 per cent. In the treated areas the rate is approximately equal in all age-groups including infants under one year of age, among whom there is a parasite rate of 5·16 per cent.; this is attributed by the author to congenital infections and the effect of travel to untreated places. [The reviewer thinks it

unsafe without further evidence to accept these explanations completely.] Parasite counts show that heavy infections in the treated area are both absolutely and relatively rare.

[Though it is as yet too early to be certain, it appears possible that another instance of eradication of an anopheline species by imagocidal work has been secured.] *G. Macdonald*

RAJINDAR PAL, SHARMA, M. I. D., KRISHNAMURTHY, B. S. & KASHYAP, S. P. **Laboratory and Field Studies on the Residual Toxicity of Chlordan, Aldrin and Dieldrin against Mosquitoes.** *Indian J. Malariology.* 1951, Dec., v. 5, No. 4, 559–68. [23 refs.]

The authors investigated the possible use of some of the newer insecticides in malaria control. In laboratory studies the larvicidal effect of chlordane, aldrin and dieldrin was compared with that of DDT. Larvae of *Anopheles stephensi* and *Culex fatigans* were placed in bowls of water with the insecticide forming a surface film. After 30 minutes' exposure the larvae were transferred to clean water with larval food and the number dead was recorded after 24 hours.

Chlordane at 10, 20 and 40 mgm./sq. ft. of water surface was effective against *A. stephensi* larvae for 4, 11 and 12 days respectively, and against *C. fatigans* larvae for 4, 8 and 12 days. Similar dosages of aldrin retained their effectiveness for slightly longer periods. An adequate kill of *A. stephensi* larvae was achieved by aldrin at 10, 20 and 40 mgm./sq. ft. of water surface for 7, 10 and 36 days and of *C. fatigans* larvae for 7, 10 and 17 days. Dieldrin, which was more toxic to mosquito larvae than either aldrin or chlordane, retained its effectiveness at dosages of 0·5, 1·0, 10·0, 20·0, and 40·0 mgm./sq. ft. of water surface for 3, 3, 15, 33 and 56 days respectively against *A. stephensi*, and at the same dosages for 1, 1, 8, 24 and 47 days against *C. fatigans*. DDT at 2 mgm./sq. ft. of water surface was effective for only 7 days against *A. stephensi* and was quite useless against *C. fatigans*.

In other tests adult female *Culex fatigans* mosquitoes were exposed to a series of glass panels treated with chlordane, aldrin, dieldrin and DDT at 50 mgm./sq. ft. These panels were considered to be effective only as long as a mortality higher than 50 per cent. was achieved. Chlordane and aldrin retained their effectiveness for 7 weeks, dieldrin for 8 weeks and DDT for 4 weeks only.

Houses in one village were sprayed with chlordane, in another village with dieldrin, and in a third they were left unsprayed. There was a significant reduction of mosquitoes in the sprayed villages one week after spraying but the numbers of mosquitoes began to increase after 3 weeks and during the sixth week the numbers rose appreciably in the area treated with chlordane.

C. M. Harrison

SCHMIDT, L. H. & GENTHER, Clara S., with the assistance of Rochelle FRADKIN, Helene HELM & J. WEILAND. **The Antimalarial Properties of 2,4-Diamino-5-p-Chlorophenyl-6-Ethylpyrimidine (Daraprim).** *J. Pharmacol. & Exper. Therap.* 1953, Jan., v. 107, No. 1, 61–91, 5 figs. [34 refs.]

This very full report describes the results of investigations on blood- or sporozoite-induced infections of *P. cynomolgi* in rhesus monkeys treated with Daraprim from the prophylactic, curative and suppressive angle. At the same time schizonticidal activity of the drug was determined in non-immune and partially immune hosts. These extensive investigations appeared to be justified since experience had suggested that the results would be applicable to

certain forms of human malaria and especially *P. vivax*. The manner in which the dosage regimen influenced the results and also production of resistance to the drug was studied. Comparison was made with the corresponding results obtained with chloroquine and chlorguanide [proguanil, paludrine].

Experimental animals of either sex weighing 3·5 to 6·0 kgm. were maintained on a basal diet and after acclimatization were infected with a strain of *P. cynomolgi* which has maintained its character unchanged over a period of 5 years' passage in the laboratory. The course of infection was followed in Giemsa-stained thick or thin films prepared at the same time each day. As a criterion of cure in prophylactic or chemotherapeutic experiments the animals were splenectomized and blood smears were examined over a period of 3 weeks. The drugs were administered by stomach tube in 50 ml. water at the same time daily, and all were of a high degree of purity. Besides those already mentioned, quinine and primaquine were used for comparative purposes.

The prophylactic, curative and suppressive studies in sporozoite-induced infections are given in detail. Daraprim caused a marked delay in the incubation period but failed to eradicate the tissue stages. In established infections the peripheral blood was freed from parasites but tissue stages persisted and late relapses occurred. When it was given once weekly in doses of 0·15 mgm. per kgm. suppression was effected and the drug was much more active than chlorguanide or chloroquine. When it was given with primaquine, established sporozoite-induced infections could be eradicated. In trophozoite-induced infections in non-immune animals minimal doses caused a significant reduction in parasitaemia and the activity greatly exceeded that of chlorguanide and chloroquine, but this difference in activity was greatly reduced when complete cures were attempted. With Daraprim parasitaemia and fever disappear slowly, and activity was greatest when the infection had lasted some time. Divided doses of the drug proved more effective than a single dose. Resistance to the drug was readily brought about and survived mosquito transmission. There was a cross resistance to chlorguanide but not to chloroquine, suggesting that the mode of action of the former is similar to that of Daraprim.

The authors conclude with the statement that "These findings have been evaluated in terms of potential usefulness of *Daraprim* in human malarias. It has been concluded that despite certain remarkable qualities noted above the greatest usefulness of the drug would appear to be as a routine suppressive. The flat dose—response curve of the compound, its slowness of action, and its potentiality for inducing resistance would appear to limit seriously the usefulness of the drug in the treatment of active infections." *J. D. Fulton*

Schmidt, L. H., Hughes, Hettie B. & Schmidt, Ida G., with the assistance of R. Ackermann, R. Hoffmann, Joanne Moore & J. Weiland. **The Pharmacological Properties of 2,4-Diamino-5-p-Chlorophenyl-6-Ethylpyrimidine (Daraprim).** *J. Pharmacol. & Exper. Therap.* 1953, Jan., v. 107, No. 1, 92–130, 4 text figs. & 17 figs. on 4 pls. [15 refs.]

Having investigated the anti-malarial properties of Daraprim in *P. cynomolgi* infections of rhesus monkeys, and indicated its value as a suppressive agent, the authors have now made a study of its pharmacological properties in the same host. Young animals of either sex were used to obtain information on absorption, excretion, metabolism, tissue distribution and toxicity. White rats were also used for tissue distribution and toxicity, and Daraprim, chlorguanide [proguanil] and chloroquine were then included in the diet, whereas

normally the freshly prepared drug was given orally by stomach tube ; but it was also given intramuscularly in excretion and degradation studies. For estimation of Daraprim and its degradation products, and also chloroquine, the method of BRODIE *et al.* [this *Bulletin*, 1947, v. 44, 793] was used, with suitable modifications, in which a salt is formed with methyl orange. Chlorguanide estimation was carried out by the hydrolysis procedure of SPINKS and TOTTEY [*ibid.*, 1946, v. 43, 399, 707].

Although Daraprim absorption from the intestinal tract was slow it was essentially complete, and maximum concentrations occurred in plasma between 2 and 8 hours after administration depending on the size of dose administered. There was a correlation between dosage and plasma levels, but wide variations occurred among individual animals. There was no accumulation in plasma except when the animals were on the point of death. From studies on urinary excretion it appeared that Daraprim was degraded to a considerable extent and allowed maximum recovery of only 20 per cent. of the parent substance.

In toxicity studies Daraprim was found to be less toxic to the rat than chlorguanide and chloroquine. In toxic doses the skin lesions, leucopenia, neutropenia and effect on myeloid elements of bone marrow caused by Daraprim differed markedly from those produced by the two other drugs. Daraprim was more toxic than chlorguanide and chloroquine to the monkey and about 40 times as toxic to the monkey as to the rat. In monkeys convulsive seizures or slow onset of intoxication occurred, with muscle weakness, malaise, loss of appetite, diarrhoea, dehydration and pigmentation of the skin. In fatal cases many lesions were found in the viscera and are described in detail. Records were also made of changes in weight on different dosage regimens, of alterations in the blood picture (including haemoglobin estimations), and special note was made of the changes in bone marrow. In both rats and monkeys Daraprim was localized to some extent in lung, liver, kidney, and spleen in proportion to the dose administered, and thus resembled chlorguanide, but the concentration was much lower than that found for chloroquine. About one-half of the animals were put on normal diet after drug treatment, and the time taken for the effects of the drug to disappear was noted. From the data obtained for Daraprim in these animal experiments it was concluded that there was " a serious potential hazard to the human user ".

[The experimental work in this and the preceding paper is very extensive and detailed, so that a brief summary fails to do it justice.] *J. D. Fulton*

FABIANI, G., CLAUSSE, J. & FULCHIRON, G. Rapports entre la réticulocytose sanguine et l'infection du rat blanc à *Plasmodium berghei*. [**Reticulocytosis in Relation to Infection with *Plasmodium berghei* in Rats**] *C.R. Soc. Biol.* 1952, Oct., v. 146, Nos. 19/20, 1580–84.

The known predilection of *Plasmodium berghei* for immature red cells has induced the authors to carry out a quantitative study of the affinity of the parasites for the reticulocytes and of variations in the number of these cells in the course of the infection in 70 rats. From these observations it is evident that *P. berghei* has a marked—though not exclusive—affinity for the reticulocytes, the proportion of which in relation to the erythrocytes increases in the course of the infection, reaching up to 95 per cent. There appears to be a definite correlation between the density of parasitaemia and the degree of reticulocytosis in the blood. *C. A. Hoare*

Fabiani, G., Fulchiron, G. & Clausse, J. Evolution du paludisme expérimental du rat après inoculation d'une quantité importante d'hématozoaires. Intérêt des variations de la réticulocytose sanguine. [**Course of Experimental Malaria in Rat after Inoculation of Massive Dose of Parasites. Variations in Reticulocytosis**] *C.R. Soc. Biol.* 1952, Oct., v. 146, Nos. 19/20, 1584–6.

The authors have observed that, after intraperitoneal inoculation of massive doses of *Plasmodium berghei* in rats, the parasitaemia rises abruptly next day, but decreases during the following days, after which it gradually reaches and then progressively exceeds the original level. Having previously [see above, 1953, p. 482] demonstrated the predilection of this parasite for reticulocytes, the authors assumed that the density of parasitaemia is incapable of increasing until the bone-marrow is stimulated by the destruction of parasitized red cells to produce and liberate into the circulation a sufficiently large number of reticulocytes. To verify this hypothesis, the following observations were carried out. First, it was shown that as long as the degree of reticulocytosis was low or normal, the parasitaemia remained stationary. But as the proportion of reticulocytes rose in the course of the infection, there was a corresponding increase in the proportion of parasitized cells. Secondly, an artificial increase of reticulocytosis was induced by experimental provocation of anaemia after injection of phenylhydrazine hydrochloride into infected rats. This was followed by a rapid increase of parasitaemia, which was proportional to the number of reticulocytes present. Finally, in another series of rats a rise of reticulocytosis was prevented by daily intraperitoneal injections of 1 cc. normal rat blood. As a result, the parasitaemia never rose above 2–3 per cent., and the rats recovered from the infection after 10 days. *C. A. Hoare*

Fabiani, G., Clausse, J. & Fulchiron, G. Influence de la réticulocytose sanguine sur l'évolution du paludisme chez les rats immunisés et splénectomisés. [**Effect of Reticulocytosis on the Course of Malaria in Immunized and Splenectomized Rats**] *C.R. Soc. Biol.* 1952, Oct., v. 146, Nos. 19/20, 1587–9.

Normally, in rats inoculated with *Plasmodium berghei*, the acute phase of the infection is succeeded by a latent infection, when the host is immune to reinoculations. But when such immunized rats are splenectomized, there is a relapse, in the course of which the infection may be more acute and the parasitaemia higher than in primary infections. Blood counts made in the course of these observations have shown that in these cases there is an abnormal increase in the number of reticulocytes (due to reactivation of a latent *Bartonella* infection and to increased erythroblastic activity of the bone-marrow). The increased reticulocytosis provides favourable conditions for the multiplication of the parasites, as shown in the previous two papers [see above, 1953, pp. 482, 483]. *C. A. Hoare*

Schneider, J., Montézin, G. & Biheu, Odette. *Pl. berghei* et recherche de médicaments antipaludiques. [*P. berghei* **in the Study of Anti-Malarials**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 6, 776–82.

The authors have previously reported on the activity of certain anti-malarials against *P. berghei* [this *Bulletin*, 1950, v. 47, 325] and consider that an infection of this type is of great value in the laboratory. Details of a technique employed to produce a standard infection in the mouse have also been given [*ibid.*, 1066].

The minimal effective doses for a number of compounds given orally and subcutaneously has now been determined, and recorded in a table which includes also values for toxicity and for chemotherapeutic indices. In a second table the latter values are compared with those obtained for *P. gallinaceum* and *P. relictum*. From their researches over a number of years the authors conclude that although *P. berghei* can be of great value in screening tests, it should be used in conjunction with the two avian strains mentioned above, as well as with some *Haemoproteus* infections. *J. D. Fulton*

KUPER, S. W. A. & PELC, S. R. **Radioactive Labelling Experiments with *Plasmodium*.** *Parasitology*. 1953, Jan., v. 42, Nos. 3/4, 269–71, 6 figs. on pl.

Radio-active oöcysts of *Plasmodium gallinaceum* were produced in *Aëdes aegypti*, the infected mosquitoes being maintained on sugar solution containing radio-active tracers (phosphorus and sulphur).

The parasites were observed in serial sections of the mosquitoes by autoradiography of preparations, from which the tracer is removed by hydrolysis, by phase-contrast microscopy, and in Giemsa-stained preparations. By this method it was possible to select an individual oöcyst in the stained preparation of one section and examine its autoradiograph in another section.

The influence of radiation on the development of the parasites was studied in batches of mosquitoes fed on sugar solutions containing 3, 1, 0·5 and 0·2 mC./ml. of ^{32}P, and ^{35}S in the form of sulphate ion. While the phosphorus isotope caused various degrees of retardation in the development of the oöcysts, sulphur in a concentration of 0·5 mC./ml. had no harmful effect on the life-cycle, as shown by the appearance of sporozoites in the salivary glands at the same time as in the control mosquitoes.

The appearance of the oöcysts in stained and unstained sections, viewed by phase-contrast and conventional microscopy, are illustrated by photomicrographs. *C. A. Hoare*

GREENBERG, J. & COATNEY, G. R. **The Eradication of Blood-Induced *Plasmodium gallinaceum* Infections in the Chick.** *Amer. J. Hyg.* 1953, Jan., v. 57, No. 1, 101–13, 1 fig. [11 refs.]

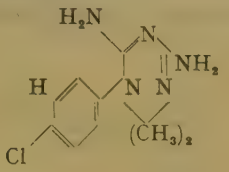
The reason for the difficulty in eradicating avian malarial infections compared with similar infections in mammals has been investigated in *P. gallinaceum* infections of the chick. An attempt has been made to find out whether drugs must be endowed with the property of killing erythrocytic or tissue forms of the parasite in order to effect cure. Chicks aged 1 to 4 weeks were inoculated in the jugular vein with known numbers of parasites, and the course of infection in controls was followed in stained smears. In treated birds the drug was given some hours before inoculation and was continued twice daily for 4 to 14 days in a dosage based on the weight of the host. When therapy was completed search was made for parasites in stained blood films, and brain tissue was also examined in smear preparations. Criteria for cure were absence of blood infection as observed directly in stained films over a 3-week period after the end of treatment, failure of this blood to infect fresh chickens, and absence of resistance to reinfection in the donor bird.

When recognized anti-malarials were used in week-old chicks many infections were eradicated if the infecting dose used was 10^3 parasites, but with 10 times this number of parasites fewer cures were obtained, and with a sufficiently large inoculum eradication of the infection could be prevented even by maximum tolerated doses of drug over a two-week period. The deaths which occurred

fell into one of 3 categories, an early and late type due to exo-erythrocytic forms and an intermediate type in which erythrocytic forms in absence of tissue forms were the cause. The course of the infection in the birds of different age-groups was essentially the same. Increase in the size of the inoculum reduced the length of the prepatent period and shortened the life of the host. The 4-week-old chicks survived the peak of parasitaemia better than those 1 week old, and more deaths were caused in this case by tissue forms of the parasite. The curative property of drugs was in general related to suppressive activity. "A series of chicks was inoculated with 10^7 parasitized erythrocytes and treated with quinine twice daily for 6 days. Parasites were present in the circulating blood, as determined by subinoculation into clean birds, throughout the period of observation, day 3 through day 7. During this period of observation there was no decrease in numbers of circulating parasites." *J. D. Fulton*

CROWTHER, A. F. & LEVI, A. A. **Proguanil—the Isolation of a Metabolite with High Antimalarial Activity.** *Brit. J. Pharmacol. & Chemotherapy.* 1953, Mar., v. 8, No. 1, 93–7. [18 refs.]

CARRINGTON *et al.* [this *Bulletin*, 1952, v. 49, 362] isolated a highly active metabolite from the urine of rabbits treated with proguanil. The isolation of this metabolite from faeces and urine of rabbits, as well as from the urine of human volunteers, is now described in greater detail. It has been shown to be 4 : 6-diamino-1-*p*-chlorophenyl-1 : 2-dihydro-2 : 2-dimethyl-1 : 3 : 5 triazine, with the following constitutional formula



and is readily isomerized on treatment with alkali to give an inactive substance. The corresponding dichloro derivative was also obtained from the urine of rabbits dosed with N^1-3 : 4-dichlorophenyl-N^5-*iso*propyl diguanide (which is the same as proguanil with an extra Cl atom in the benzene ring).

To obtain the metabolite from proguanil rabbits were given 50 mgm. per kgm. of the drug in 1 per cent. solution once daily, and the substance was isolated as the picrate, which was then converted to the free base which was about 10 times as active as the parent substance against blood-induced *P. gallinaceum* infection of chicks and was also effective against exo-erythrocytic forms of the parasite. The yield corresponded to 1 to 3 per cent. of the proguanil administered. About 10 per cent. of the latter based on dosage was also present unchanged in the urine, as well as traces of the inactive isomer of the metabolite. From the faeces of rabbits the active metabolite was isolated in 1 per cent. yield and in 5 per cent. yield from human urine. The corresponding metabolite from the dichloro derivative was likewise obtained from rabbit urine in 0·75 per cent. yield and was 100 times as active as proguanil against blood-induced infections of *P. gallinaceum* in chicks. *J. D. Fulton*

SERGENT, Ed. & SERGENT, Et. Recherches expérimentales sur l'infection latent et la prémunition dans le paludisme. (Seconde partie.) [**Research on Latent Infection and Premunition in Malaria. Part II**] *Arch. Inst. Pasteur d'Algérie.* 1952, Sept., v. 30, No. 3, 203–39, figs.

The first part of this work [see this *Bulletin*, 1952, v. 49, 933] described the techniques employed in studying the effect of *Plasmodium relictum* on canaries.

The present paper is a continuation and includes the determination of length of infection in birds inoculated with blood, and the duration of the resistance conferred by the attack. First, 417 canaries were investigated : infection persisted in 143 during part or whole of the first year, 112 in the second, 85 in the third, 61 in the fourth, 13 in the fifth and 3 in the sixth—in other words up to old age (canaries die at about 7 years). Infection can, however, disappear as early as 10 months. These latent infections maintain their virulence, and seem to keep the birds in a state of premunition. Seventy-eight of such birds were exposed to fresh infections with the same strain of parasite, for periods up to 4½ years after the original infection. Except in one case, all the canaries responded by a transient parasitaemia of less than one parasite per field, and in 3 cases parasites were actually entirely absent ; 152 out of 154 controls behaved in the usual way to infection with *P. relictum*, with a 15 per cent. mortality. Neither the age of the infection nor repeated re-inoculations seemed to affect the degree of resistance, which was just as effective 4 years or more after exposure as after 6 months. *P. C. C. Garnham*

TRYPANOSOMIASIS

NIGERIA. **Sleeping Sickness Service Annual Report 1951–52** [PRICE, J. L., M.O. Sleeping Sickness Service ; FROGGATT, T., Senior Control Officer]. 9 mimeographed pp. [1953.]

The organization and development of the campaign against sleeping sickness in Nigeria in recent years has been described previously in special articles and in Annual Reports [see this *Bulletin*, 1946, v. 43, 1022 ; 1947, v. 44, 971 ; 1948, v. 45, 502 ; 1949, v. 46, 221, 224, 229 ; 1950, v. 47, 330 ; 1951, v. 48, 684 ; 1952, v. 49, 243]. The first part of the present Report, signed by the Medical Officer, is chiefly a statement of the numbers of people examined and of new and relapsed cases of sleeping sickness, while the second part, by the Senior Control Officer, is a short account of the work of tsetse-fly control carried out in various regions of the Colony during the year.

The Senior Staff had an average of one Medical Officer and one or two Superintendents and they were occupied mainly in dealing with situations of special clinical or epidemiological importance. The routine medical work was done largely by the Junior Service Staff of Sleeping Sickness Dispensary Attendants, led by 20 Senior Dispensary Attendants and 6 Sleeping Sickness Assistants ; they are regarded by the Medical Officer as the " backbone of the Service " and are praised for their ability and integrity. Nearly all the endemic provinces were toured by the Medical Officer.

A total of 1,118,592 people were examined in the Team Resurveys, Dispensary Resurveys, and Minefields Surveys, and 2,740 new cases (0·245 per cent.) were found ; the Medical Field Unit Surveys examined 12,276 people and found 143 new cases. Other new cases were found at the Sleeping Sickness Dispensaries (636), Native Administration Dispensaries (1,815), Hospitals (441) and Missions (537), making a total of 6,311 new cases [about 1,000 fewer than in the preceding year]. Relapsed cases treated numbered 1,272, making a grand total of 7,583 cases.

The second part of the Report summarizes the work of survey and clearing ; over 700 miles of stream clearing are mentioned. An alarming spread of *Glossina morsitans* in Eastern Zaria, threatening the southern ends of the

Anchau corridor and other neighbouring areas, and killing many cattle, made it necessary to use about half of the Control Staff, helped by the Sleeping Sickness Service, to check it ; this somewhat disorganized the control work in other areas. If this advance of the fly is successfully dealt with, it will be necessary to consolidate the position by settlement. *J. F. Corson*

JACKSON, C. H. N. **Seasonal Variations in the Mean Size of Tsetse Flies.** *Bull. Entom. Res.* 1953, Jan., v. 43, Pt. 4, 703–6, 1 fig.

It was found that the sizes of 3–4-week-old male tsetse flies, *G. swynnertoni*, *G. pallidipes* and *G. morsitans*, fluctuated periodically from large to small over a period of 3½ years. All 3 species showed much the same rhythm in these periodic changes in size. It is known for the part of Tanganyika where the flies were captured that the pupal period lasts about 35 days. The size of a fly is fixed when, as a fully-grown larva, it is deposited by the parent female to pupate almost at once. It seemed therefore that the factor influencing size must have been effective about 2 months before the flies were captured. A negative correlation of size and the mean saturation deficiency at 2 p.m. of 2 months prior to capture is shown to exist. Of the 3 species of fly, *G. pallidipes* shows rather greater extremes in size, suggesting that it is more easily affected than the other 2 species by the environment which they shared. There is some support for this interpretation from the tendency to spontaneous reduction of *pallidipes*. A negative correlation of size with maximum temperatures prevailing 2 months before capture of the flies was of a similar order. *D. S. Bertram*

RHODESIA, NORTHERN. **Some Notes on Northern Rhodesia Tsetse Fly and their Relationship to Trypanosomiasis** [STEEL, W. S.]. 15 pp. 1952. Lusaka : Govt. Printer. [6*d*.]

HENRARD, C. Une Tsé-tsé nouvelle du groupe "*fusca*", *Glossina vanhoofi*, sp. nov. [**A New Tsetse Fly of the *fusca* Group, *Glossina vanhoofi***] *Rev. Zool. Bot. Africaines*. 1952, Apr. 25, v. 45, Nos. 3/4, 193–7, 2 figs.

The author describes a new species of tsetse fly from the Belgian Congo closely allied to *Glossina fuscipleuris*, from which he distinguishes it both by external characters and by differences in the male and female genitalia. The external differences are of colour only, and the differences in the male genitalia lie mainly in the shape of the three pairs of appendages which are attached to the harpes in both species. In the females the signum shows characters resembling both *Glossina fusca* and *G. fuscipleuris* and in this connexion it is of interest to note that in one of the colour characters the new species resembles *G. fusca* rather than *G. fuscipleuris*. These, and a parallel mixture of characters shown by the tsetse described by VAN EMDEN [this *Bulletin*, 1944, v. 41, 829] as *G. nigrofusca* var. *hopkinsi*, make one wonder whether such forms as these may not eventually prove to be hybrids. The author has examined 39 specimens of the new species, which have come, with one exception, from the eastern Congo, and from what he describes as the eastern edge of the equatorial forest. This is also the eastern border of the main dispersal area of *G. fusca*. The one exception was collected in the north-west Congo, in the Ubangui area, this time on the northern edge of the equatorial forest and from a locality lying between a belt of *G. fusca* and some outlying areas from which there have been records of this species. *G. fuscipleuris* is known to occur in the neighbourhood of all the eastern areas from which the new species has been recorded.

W. H. Potts

GALLAIS, P. & BADIER, M. Recherches sur l'encéphalite de la trypanosomiase humaine africaine. Corrélations cliniques, anatomiques, électro-encéphalographiques, biologiques. [**A Clinical and Pathological Study of African Human Trypanosomiasis**] *Méd. Trop.* Marseilles. 1952, Nov.–Dec., v. 12, No. 6, 633–75, 5 tracings & 17 figs. [53 refs.]

[It should be stressed at the start that this paper only describes the findings in a single African patient in whom the infecting organism was *Trypanosoma gambiense*, and in the reviewer's experience the findings and conclusions in *gambiense* patients are neither necessarily nor generally applicable to *rhodesiense* patients, although writers often do so apply them.]

An African from the middle Congo aged 30 years, who had left Africa more than a year previously, was admitted to hospital in Marseilles in August 1950 with fever, somnolence and cervical adenitis. No trypanosomes were found in his blood, gland juice or cerebrospinal fluid. The cell count in the last was 7 lymphocytes per cmm. and the protein 0·5 gm. [presumably per 100 cc.]. [The raised protein by itself is evidence of a late stage of the disease.] In September 1950 trypanosomes were found on one occasion in gland juice and cerebrospinal fluid, the cell count now being 127, protein 0·5 gm. per cent., and colloidal benzoin curve of the paralytic type. The patient was given 6 injections of moranyl and 24 of tryparsamide (1·8 gm.). In February 1951 his general condition was good but he was asthenic and mentally indifferent. All movements were very slow, pruritis was constantly troublesome, and he had tremor of the fingers and twitching of the forearm muscles.

Neurological examination revealed little that was abnormal ; there was ptosis of the right upper eyelid, diminished visual acuity (perhaps the result of tryparsamide) with normal fundi, slight motor weakness on the left side and hypertonicity of the arms with cogwheel movements. He complained of severe pain in the legs and shooting pains in both tibiae. In spite of somnolence there was keen awareness of pain. Sexual potency had been absent from the beginning of the period of observation.

Trypanosomes were not found in the blood at any time ; the formol gel and cold agglutination reactions were negative ; the blood Kahn reaction was ++ on the 22nd February and negative the next day. The authors do not make any comment on this. Pneumo-encephalography showed marked dilatation of the ventricles. The cerebrospinal fluid was examined at intervals, trypanosomes were seen on the one occasion only, the cell count rose from 7 per cmm. to 461 (lymphocytes, plasmocytes and morula cells), and protein rose from 0·5 gm. to 1·0 gm. Electro-encephalograms showed little alteration at the start (when the disease was already in an advanced stage) but progressive changes were recorded until at the last there was evidence of a subacute leuco-encephalitis.

Death occurred after acute pulmonary oedema on the 2nd April 1951—almost 8 months after the first admission to hospital. There had been increasing slowness of movement, somnolence, athetosis, myoclonus, hypopyrexia and finally epileptiform attacks.

Post-mortem studies of many of the internal organs were made but chiefly of the brain. The histological findings are described and well illustrated in such detail that they cannot be summarized adequately. The wide extent and severity of the lesions in the white matter compared with the grey matter is remarked on. The frontal region was the one most affected. Perivascular infiltration, gliosis and demyelinization were the notable features. [Interested readers are warmly advised to read the descriptions and the discussion on them for themselves.]

H. G. Calwell

Afrique Occidentale Française. Laboratoire Central de l'Elevage. Dakar. 1952, Apr. Carte provisoire de répartition des trypanosomes pathogènes des animaux domestiques en A.O.F. [**Provisional Map of the Distribution of Trypanosomes Pathogenic to Domestic Animals in French West Africa**]

This map is probably the one referred to on p. 67 of the 1951 report of the " Laboratoire Central de l'Elevage de Dakar " published in the *Bulletin des Services de l'Elevage et des Industries Animales de l'Afrique Occidentale francaise, Vol. 5, No. 1 of Jan.–March, 1952, p. 57.* On a scale of 1 : 5,000,000 it shows the occurrence of animal trypanosomiases in French West Africa by means of dots of 4 bold colours, each denoting the species of trypanosome concerned (*T. vivax cazulboui, T. brucei, T. congolense and T. evansi*). These are superimposed on a base faintly printed in 2 colours, one of which shows state and territorial boundaries together with a welcome abundance of place names, and the other the main and secondary roads, and rivers.

The map is a little difficult to interpret, especially without an accompanying text (which has not been received), as its legend bears a set of symbols for the different trypanosomes, which are not used on the map, as well as the coloured dots. The legend also shows 4 percentages which are presumed to indicate the proportions in which the different species of trypanosome were represented among the cases of trypanosomiasis on which the map is based.

A point of considerable interest is the extension of trypanosomiasis well outside the northern limits of tsetse as shown on this map, which is evidently based on recent information ; this is shown to occur throughout a zone which varies from 50 to nearly 500 kilometres in depth, and which mainly exceeds 100 kilometres. A useful feature is the indication of regions regarded as insufficiently investigated, particularly as some trypanosomiasis symbols are shown in these areas. *W. H. Potts*

Burdin, M. L. & Plowright, W. **Delayed Toxicity of certain Trypanocidal Drugs in East African Zebu Cattle.** [Correspondence.] *Nature.* 1952, Apr. 19, 666–7.

Working in Kabete, Kenya, the authors have regularly observed evidence of liver damage in cattle treated subcutaneously, intramuscularly or intravenously with dimidium bromide at dosages of 2 or 3 mgm. per kgm. It develops 35 to 50 days after treatment, in the form of loss of weight and condition, a positive van den Bergh reaction and, sometimes, clinically observable jaundice and an increase of alkaline phosphatase in the serum. Periportal fatty infiltration of the liver is observed in biopsy and necropsy material. The authors refer to the well-known " photosensitization " sequelae of dimidium therapy without making it quite clear to what extent they regard this as related to the symptom complex they now describe. The latter is, however, distinguishable from that which follows treatment by 7·5 to 10 mgm. antrycide methylsulphate, since the antrycide toxicity is associated with a significantly shorter observation period, of the order of 2 to 3 weeks, and with the kidney as the main site of toxic damage.

The toxic syndrome now described was also observed after treatment by some but not all of 6 other members of the phenanthridinium series. A consideration of the formulae of the various compounds concerned leads the authors to the hypothesis that the specific toxicity is associated essentially with amino groupings in position 2 and possibly in position 7 of the phenanthridinium ring, and with methyl at the quaternized nitrogen of position 10. Since other alkyl groupings at position 10 are not associated with these toxic effects, it is postulated

that the mechanism of the toxic action is an interference with biological methylations by the methyl-substituted quaternized nitrogen of the offending compound. *E. M. Lourie*

PACKCHANIAN, A. **The Temporary Survival of** *Trypanosoma evotomys* **in** *Triatoma*. *Texas Reports on Biol. & Med.* 1952, v. 10, No. 4, 883–4.

Previous studies had shown that various trypanosomes and leishmaniae would not survive in triatomids for more than 10 days [this *Bulletin*, 1949, v. 46, 18, 21]. It is now shown that *Trypanosoma evotomys* from a red-back mouse will neither multiply nor survive longer than 5 days in *Triatoma gerstaeckeri*.

TALICE, R. V., VERÍSSIMO, S., OSIMANI, J. J. & FRANCA, María E. Estudio epidemiológico sobre la enfermedad de Chagas de la zona endémica del Uruguay. [**Epidemiology of Chagas's Disease in the Endemic Zone of Uruguay**] *Bol. Oficina Sanitaria Panamericana*. 1952, Dec., v. 33, No. 6, 595–620, 18 figs. [Numerous refs.]

This article contains much information, but of local rather than of general interest. The authors review conditions in various localities in the Departments of Rivera and Artigas, telling of the number of dwellings, the total inhabitants, the degree of infestation of the houses by Triatomidae and infection of the Triatomidae by trypanosomes, the number of patients giving a positive Guerreiro-Machado reaction, xenodiagnostic tests, with excellent photographs of the infected dwellings, and the use of Gammexane spray. Those who wish for details should consult the original; here we may sum up the general findings and conclusions: Triatoma (*T. infestans*) is very rife in practically all the huts, even in those recently built, and of these bugs both nymphs and adults are infected with trypanosomes in 34 per cent. The Guerreiro-Machado reaction was positive in 20 per cent. of the people of Rivera and 4·6 per cent. of those of Artigas, and among children up to 14 years of age, 2 and 6·4 per cent. respectively yielded xenopositive results and it is estimated that among the 500,000 inhabitants there are "between 20,000 and 100,000 infected" [these are wide limits] and there are many with chronic cardiac affections due to *T. cruzi*. Gammexane in a strength of 500 mgm. per sq. metre has proved a very effectual insecticide. There is an extensive bibliography of 71 references most (52) to papers published by Talice himself alone or in collaboration.

H. Harold Scott

DE LUCENA, D. T. Subsídios para o estudo epidemiológico da Doença de Chagas no Nordeste. [**Epidemiological Studies of Chagas's Disease in North-East Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Apr., v. 4, No. 2, 171–5. [32 refs.]

The English summary appended to the paper is as follows:—

"The author reviews his observations as well as those of other workers about Chagas' disease in the states of Pernambuco, Paraíba and Ceará, from 1940 to this date, pointing out the presence of infected triatomids and numerous patients with symptoms of the chronic form of the disease, without the finding of any case in the acute stage, and contrasts those observations with the reporting of numerous acute cases in Southern Brazil, Argentina, Uruguay and Paraguay. After quoting several papers which deal with the distinction of strains of *Schizotrypanum cruzi*, very diverse physiologically as well as pathologically, he suggests that the strain prevailing in the semi-arid states of north-eastern Brazil is perhaps the same found in the United States, in the states of California, Texas, Arizona and New Mexico, which present an environment similar to the one of that section of Brazil. He believes that further studies in that part of Brazil will probably prove his statement is correct."

Gajardo Tobar, R. Capacidad de ayuno de los triatomídeos chilenos. [**Survival Time of Fasting Chilean Triatomata**] *Bol. Informaciones Parasitarias Chilenas*. 1952, Oct.–Dec., v. 7, No. 4, 56–9. English summary (3 lines).

It is known that Triatomidae can exist for a long time without food and also when their natural food is not obtainable they can subsist on substitutes. Four to 7 months has been reported by different authors. The present author has tried to determine the survival time with greater accuracy. He has, therefore, carried out a series of experiments, 7 with *T. infestans* and 1 with *Mepraia spinolai* (*T. spinolai*), using adults, nymphs and larvae and determining survival under different temperatures and in surroundings of varying degrees of humidity. Tables are given showing the numbers of insects, at different stages, captured in various places, and the results (numbers dead and numbers still living) at monthly intervals. The details of each experiment are recorded separately but may be summed up by saying that winged males lived only 3 days in captivity ; larvae and nymphs withstood starvation considerably longer than did the adults : Apterous males of *M. spinolai* lived up to 240 days ; females were more resistant than males, living for 335 days. Females of *T. infestans* lived up to 183 days. Larvae in their last moult lived without food for 395 days and nymphs for 365 days.

The experiments go to prove that Triatomidae have great powers of withstanding fasting and adverse climatic factors. The temperatures to which they were subjected ranged from 5° to 37°C., and humidity from 50 to 100 per cent. but usually 60–80 per cent. In Chile the triatoma abounds more in dry places away from the coast, but *M. spinolai* is found from the Cordilleras to the sea and especially in the north, the Iquique sector. [These results are of much academic interest, but in nature the insects would be able to find shelter from adverse climatic conditions and also could obtain food from various sources.]

H. Harold Scott

Salgado, A. de A. Distribuição dos triatomídeos domiciliares no Município de Monte Belo—Minas Gerais. [**Distribution of Domestic Triatomids in Monte Belo, Minas Gerais**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Apr., v. 4, No. 2, 192–7, 1 folding map.

The English summary appended to the paper is as follows :—

" The house survey of Monte Belo county, state of Minas Gerais, permitted the capture of triatomids in 71·28 per cent of the localities, all being of the species *T. infestans*. In only 7 localities, among 72, did the triatomids present *S. cruzi* in the feces. The infection index was 54·29 per cent at the county seat, while it was of only 25·46 per cent in the rural districts."

Pinto, O. da S., Bicalho, J. C. & Guedes, A. da S. Contribuição ao conhecimento da distribuição geográfica dos triatomídeos domiciliários e de seus índices de infecção natural pelo *S. cruzi* no Estado de Minas Gerais, Brasil. [**Geographical Distribution of Domestic Triatomids and their Index of Natural Infection with *T. cruzi* in Minas Gerais, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Apr., v. 4, No. 2, 105–29, 4 folding maps.

The English summary appended to the paper is as follows :—

" The authors present the results of the survey performed by the National Service of Malaria in the state of Minas Gerais to establish the geographical distribution of domiciliary triatomids and their indices of natural infection by *Schizotrypanum cruzi*, in order to permit the preparation of a plan campaign

against Chagas' disease in that state. They began by the recommendation that the survey should be done just before the beginning of the campaign to enable the application of insecticides wherever it may be necessary. They reaffirm the responsibility of the triatomids in the transmission of the disease to man, and suggest that the work of the survey be carefully done, the specimens of triatomids being collected only within the dwellings, in order not to incriminate species of the bug innocent to man nor to consider as positive areas that are really free of the disease. The survey led to the identification of 78,060 triatomids, the feces of which were examined in 21,656 cases, 3,733 of them being considered positive for the trypanosome, or a general index of infection of 17·24 per cent. *T. sordida*, *P. megistus* and *T. infestans* are considered the only species of epidemiological importance, especially the last two which presented the indices of natural infection of 16·41 and 18·54 per cent, respectively."

Machado, H. & Pinto, O. da S. Contribuição ao conhecimento da distribuição geográfica dos triatomídeos domiciliários e de seus índices de infecção natural no Estado do Ceará, Brasil. [**Geographical Distribution of Domestic Triatomids and their Index of Natural Infection with** *T. cruzi* **in Ceará, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Apr., v. 4, No. 2, 157–70, 3 folding figs. (maps).

The English summary appended to the paper is as follows :—

" The survey was performed from May to September 1951 in the state of Ceará, including 115 localities in 20 counties, with an area of 45,480 square kilometers and a population of 851,588. The survey disclosed the presence of domiciliary triatomids of the species *P. megistus*, *T. brasiliensis* and *T. maculata*, besides *Rhodnius prolixus* previously referred to by several authors. The former three species were found to be naturally infected by *Schizotrypanum cruzi*. The authors believe that the most important vector of the disease is *T. brasiliensis*, notwithstanding the fact that several authors have previously considered *P. megistus* as such. The highest index of natural infection was found in *P. megistus* (8·47 per cent), but *T. brasiliensis*, with an index of 7·63 per cent, has a much wider diffusion and a higher numerical predominance. In only 0·94 per cent of specimens did *T. maculata* show the presence of *S. cruzi*. If the low general infection index of the triatomids found by the authors is taken together with the observations of other investigators (low index of natural infection, low index by means of the xenodiagnosis and low index by means of the complement fixation), they have the impression, at least for this moment, that in the state of Ceará the diffusion of Chagas' disease is limited. Out of the 79 counties of the state, the survey showed, up to now, the presence of triatomids in 31 of them, with 18 positive to *S. cruzi* infection. The National Service of Malaria has the intention to extend the survey to all the 79 counties of the state, to be able to know the exact importance of Chagas' disease as a public health problem."

Pinto, O. da S. Contribuição ao conhecimento da distribuição geográfica dos triatomídeos domiciliários e de seus índices de infecção natural pelo *Schizotrypanum cruzi* no Estado de São Paulo—Brasil. [**Geographical Distribution of Domestic Triatomids and their Index of Natural Infection with** *T. cruzi* **in São Paulo**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Apr., v. 4, No. 2, 131–43, 3 folding maps.

The English summary appended to the paper is as follows :—

" In surveys of 60 counties of the state of São Paulo performed by the National Service of Malaria, 7,424 domiciliary triatomids were captured, out

of which 6,904 were *T. infestans*, 512 *T. sordida* and 8 *Panstrongylus megistus*. It seems that the latter species has no epidemiological importance in the state of São Paulo, contrarily to what it occurs in the state of Minas Gerais. But *T. sordida* presents, in that state, wider diffusion and higher percentage of natural infection. However, the most important species is *T. infestans*, found in 56 of the surveyed counties, with an infection index of 25·19 per cent. Only domiciliary triatomids captured by inspectors of the National Service of Malaria were included in the study."

PELLEGRINO, J. & BRENER, Z. A reação de fixação do complemento na doença de Chagas. II. Observações sôbre o antígeno de Davis. [**The Complement Fixation Test in Chagas's Disease. II. Notes on Davis's Antigen**] *Hospital.* Rio de Janeiro. 1952, Sept., v. 42, No. 3, 423–34. [30 refs.] English summary (7 lines).

The authors have tested for their permanence a large number of antigens prepared by Davis's method and subsequent modifications of it to determine their value in the diagnosis of Chagas's disease. The importance of this knowledge lies in the fact that the number of special laboratories where this work can be carried out is limited and cultivation of *T. cruzi* in large amounts is not an easy matter. They conclude that Davis's merthiolate technique is a notable contribution to the problem and renders possible the standardization of the reaction and puts us in possession of the most certain means of diagnosing chronic cases of Chagas's disease. They have tested antigens prepared as long ago as 1947 and compared them with others prepared as recently as 1952 and find them all serviceable, though the effective period for each batch varies considerably, between 1 : 100 and 1 : 1,600. Papers dealing with this subject, most of which are referred to in this present article, have already been abstracted in this *Bulletin* [see 1948, v. 45, 315, and 506 where other references are given ; also 1949, v. 46, 1129]. *H. Harold Scott*

PELLEGRINO, J. & BRENER, Z. A reação de fixação do complemento na doença de Chagas. III. Observações sôbre as propriedades da fração polissacarídea isolada de formas de cultura do *Schizotrypanum cruzi*. [**The Complement Fixation Test in Chagas's Disease. III. Studies on the Polysaccharide Fraction extracted from Culture Forms of** *Schizotrypanum cruzi*] *Hospital.* Rio de Janeiro. 1952, Oct., v. 42, No. 4, 553–9. [23 refs.] English summary (4 lines).

Complement fixation for the diagnosis of Chagas's disease has passed through several stages : first, using as antigen extracts of organs of animals experimentally infected with *T. cruzi* ; next, cultures of the trypanosome ; then Davis's modification of suspensions of the cultures with merthiolate and later with benzene and with chloroform.

In the present paper the authors report on the use of polysaccharide fractions isolated from culture forms of the trypanosome. There is no need to go into detail, for the upshot was that there was no fixation of complement with sera from chronic sufferers from the disease and, at the same time, the polysaccharide fraction has no anticomplementary activity. *H. Harold Scott*

PELLEGRINO, J. & BRENER, Z. A reação de fixação do complemento na doença de Chagas. IV. Observações feitas em casos agudos de esquizotripanose. [**The Complement Fixation Test for Chagas's Disease. IV. Remarks on Reactions made in Patients in the Acute Stage**] *Hospital.* Rio de Janeiro. 1952, Nov., v. 42, No. 5, 755–61. [23 refs.] English summary (4 lines).

The means, or methods, for diagnosis of Chagas's disease are many, such as search for *T. cruzi* in fresh blood smears, in thick drops, or, when they are sparse,

by xenodiagnosis, by blood culture and by inoculation of the suspected blood into susceptible animals. In addition, there are serological methods—complement fixation, precipitation with the polysaccharide fraction of cultivated trypanosomes. The results of using the last, or rather the absence of positive results in the chronic disease have been given in the preceding abstract. Their use in the acute phases of the infection has led to discordant reports. The authors are of the opinion that c.f. reactions are not of great value in the early stages, seeing that other and more reliable methods are available.

In this paper they record their results in 14 cases of the acute stage of the disease, in patients ranging in age from 1½ to 15 years all of whom showed trypanosomes in the peripheral blood. The precipitin reaction with polysaccharides isolated from cultural forms was also tried by the Fuller method [used in 1938 for haemolytic streptococci, *Bull. Hyg.*, 1938, v. 13, 831]. The precipitin reaction was positive in all, but the c.f. reaction was negative in half the patients, positive in 6 and doubtful in one. The authors, therefore, range themselves on the side of those who regard the c.f. reaction as of little value in the diagnosis of Chagas's disease, seeing that the results are negative in half the cases [but only 14 were tested]. *H. Harold Scott*

Dias, E., Brant, T. C. & Santos, R. M. Casos de cardiopatia chagásica crônica no Município de Mococa, Estado de São Paulo. [**Cardiac Affections due to Chagas's Disease in Mococa, São Paulo**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Apr., v. 4, No. 2, 184–6, 1 fig. English summary.

In the course of investigations carried out in the town and municipality of Mococa samples of blood were obtained from 24 unselected persons and complement-fixation tests were carried out, with cultures of *T. cruzi* as antigen. Eight could not be examined owing to contamination or to the tube arriving broken at the laboratory. Of the other 16, 6 were positive and 10 were negative. In three of those giving a positive reaction (the patients were aged 9, 11 and 17 years), the electrocardiograms showed no abnormality, but in the other three, a child of 10 years and two women, aged 25 and 46 years, there were marked signs of cardiac disturbance and arhythmia, notably partial or complete A–V block and ventricular extrasystoles. Among the three whose specimens of blood could not be examined at the laboratory the ECG showed A–V blockage. *H. Harold Scott*

Pinto, O. da S. & Bicalho, J. C. Profilaxia da Doença de Chagas no Estado de Minas Gerais por meio de inseticidas. [**Prophylaxis of Chagas's Disease in Minas Gerais by Means of Insecticides**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Apr., v. 4, No. 2, 145–56, 1 folding map.

The English summary appended to the paper is as follows :—

"The authors describe the control work of Chagas' disease by means of house spraying performed in the state of Minas Gerais by the National Service of Malaria, from May 1950 to September 1951. During this period, 68,699 houses were sprayed in 4,510 localities of 74 counties aggregating an area of 99,712 square kilometers and 1,211,071 population. The insecticides used were B.H.C. (40,979 houses) with the minimum dose of 500 milligrams per square meter, and Rhodiatox (27,567 houses) with the minimum dose of 0·40 per square meter. When applied in localities with Chagas' disease and malaria, Rhodiatox was associated to DDT. While exact information is still scarce, the great reduction observed in the density of triatomids in the sprayed houses and certain observations relating to the decrease of cases of Chagas' disease lead to the conclusion of the efficiency of the method."

Dias, E. & Pinto, O. da S. Combate aos triatomas com B.H.C. na cidade de Bambuí, Minas Gerais. [**Destruction of Triatomid Bugs with BHC in the City of Bambui, Minas Gerais, Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Jan., v. 4, No. 1, 62–4.

The English summary appended to the paper is as follows :—

"The routine work of triatomid bug destruction, by the National Service of Malaria, was begun at the city of Bambuí, state of Minas Gerais, in March of 1950. In this locality, 228 dwellings in very poor outlying districts were sprayed with 7·5 per cent 'Lexone' in water. Lexone is a 10 per cent isomer of BHC. A total of 23,465 square meters of interior walls and ceilings were sprayed, with an expenditure of 2,131 liters, or the equivalent of about 0·7 grams of the gamma isomer per square meter. The control was done by the daily inspection of all houses during 15–20 days after the spraying and the inspection permitted the collection of 4,679 bugs from 92 houses, no bugs having been found in 60 per cent of the sprayed houses. A test dusting with 21,600 grams of a pyrethrum containing insecticide powder, performed two months after the BHC spraying, permitted the capture of 240 bugs from 28 houses, out of the total 72 in which the test dusting had been done and which belonged to the 92 houses of the group previously sprayed with Lexone. From those same 92 houses, previous dusting with pyrethrum containing insecticides had permitted the capture of 18,182 bugs, while in the 136 houses which gave no bugs after the Lexone spraying the previous application of insecticides had permitted the collection of 6,450 bugs."

Pinto, O. da S. Profilaxia da Doença de Chagas na região da Bacia do Rio Grande, Estado de São Paulo, por meio de inseticidas. [**Prophylaxis of Chagas's Disease in the Basin of the Rio Grande by Means of Insecticides**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Apr., v. 4, No. 2, 176–83, 1 folding map.

The English summary appended to the paper is as follows :—

"In its program of control of Chagas' disease in the state of São Paulo, the National Service of Malaria sprayed with BHC a total of 40,227 houses distributed in 1,805 localities of 30 counties of the Rio Grande river basin, aggregating an area of 14,673 square kilometers and 483,742 population. Test dustings with pyrethrum containing powders are being done, the results of which will be presented later. Meanwhile, partial data point out to favorable results."

Thiermann I., Erica & Christen A., R. Influencia del acetato de cortisona y de la aureomicina como agente agravador de la infección chagásica atenuada. [**Aggravating Effect of Cortisone Acetate and Aureomycin in Experimental Chagas's Disease with Low Parasitaemia**] *Bol. Informaciones Parasitarias Chilenas.* 1952, Oct.-Dec., v. 7, No. 4, 53–5.

The English summary appended to the paper is as follows :—

"Cortisone acetate, in high dose, alone or associated with aureomycin, had an aggravating effect on experimental *T. cruzi* of dba mice inoculated with a low number of parasites. Aureomycin alone had a similar but less marked effect."

Atías M., V. & Christen A., R. Ensayos de quimioterapia en la enfermedad de Chagas experimental. X. Hidrazida del ácido isonicotínico. [**Chemotherapeutic Trials in Experimental Chagas's Disease. X. Isoniazid**] *Bol. Informaciones Parasitarias Chilenas.* 1952, Oct.-Dec., v. 7, No. 4, 59–61.

The English summary appended to the paper is as follows :—

" Isonicotinic acid hydrazide was ineffective as a curative drug in experimental *Trypanosoma cruzi* infection of dba mice, although the treated animals survived longer than the controls. The longest survival time was observed in the females of the treated group."

LEISHMANIASIS

Bellon, J. Un cas de kala-azar autochtone au Tchad (Ouaddaï). [**An Autochthonous Case of Kala Azar in Tchad**] *Arch. Inst. Pasteur d'Algérie.* 1952, Dec., v. 30, No. 4, 377–81, 1 chart.

Fendall, N. R. E. **Kala-Azar in East Africa with particular reference to Kenya and the Kamba Country. Parts I, II, III & IV.** *J. Trop. Med. & Hyg.* 1952, Sept., Oct. & Nov., v. 55, Nos. 9, 10 & 11, 193–204 ; 220–33 ; 245–56, 5 maps & 5 figs. [Numerous refs.]

Kala azar is well established in the Anglo-Egyptian Sudan, Abyssinia, Eritrea, and cases have been reported from Portuguese East Africa, but not from Uganda and Tanganyika. " In Kenya foci exist in the Northern Frontier Province (Uaso-Nyrio River area and Namuruputh-Todenyang area by Lake Rudolf) and in the Machakos District of Ukambani somewhere between Machakos and Kitui. From the latter foci, besides visceral leishmaniasis an authenticated case of cutaneous leishmaniasis has been described."

The official records including hospital returns seem to indicate that kala azar does not exist in East Africa outside Kenya ; in Kenya sporadic cases have been reported since 1911 but since 1939 the numbers appear to have been increasing year by year. This may be due to better diagnosis, but it is more probably a real increase that started about 1939 as a result of the introduction of the infection resulting from troop movements.

The presence of another endemic area north and east of Kitui, between Kitui and Garissa, does not seem to have been appreciated prior to the present investigation. In the Machakos district, kala azar appears to be endemic " throughout the whole of the naturally occurring basin of relatively low-lying and badly eroded land, bounded on three sides by mountain masses and on the fourth and eastern side by the Athi river and Yatta Plateau ". Such evidence as is available seems to indicate that it was introduced in 1942 by returned Wakamba soldiers.

In the Kitui district evidence suggests that the disease was introduced to the Ngomeni focus by troop movements during the Abyssinian campaign in 1941 to 1943 and that it spread from this focus ; there is a north-easterly extension in the Mivukoni and Tseikura locations and two subsidiary foci at Nuu and Eudau. The terrain is a hot, dry, low-lying plain ; *Phlebotomus congolensis* and *P. africanus* abound throughout the district.

The age distribution of 31 cases was as follows :—7 were under 11 years, 9 between 11 and 15, 6 between 16 and 25 years, and 9 were 26 years or over; that

is more than half were children. In about half the patients the disease had been present for 6 months or more when they were first seen ; the important symptoms of which they complained were loss of weight (19 cases), enlarged spleen (15), " enlarged abdomen " (14), fever (13), pain over spleen (11) and cough (11 cases). The physical signs included splenomegaly (31 cases) and hepatomegaly (25), emaciation (30), anaemia (29), pyrexia (26), adenitis (13), hair changes (7), pigmentary changes (5), oedema (5) and jaundice (4 cases). In many cases there was a concomitant infection, including respiratory infection in 10. There was one case of noma. The blood count showed a mean of 2·446 million red cells per cmm. with range of 1·450 to 3·700 ; the mean haemoglobin percentage was 10 gm. and the mean leucocyte count 3·717 thousand per cmm. with 40 per cent. granulocytes.

In treatment, urea stibamine was used in 11 cases with one death ; there were pyrexial reactions in 6 cases, 4 of which were severe. Pentamidine isethionate was used in 13 ; daily or alternate day intramuscular injections were given in doses of 4 mgm. per kgm. with a maximum of 200 mgm. ; a total of 2 to 4·5 gm. was given with an immediate cure rate of 70 per cent. ; this drug however gave rise to no toxic reactions. The response to treatment appeared to be more favourable than is usual in the Sudanese type of kala azar, and to be closer to that of the Indian type. *L. E. Napier*

Purandare, N. M., Bhende, Y. M., Figueredo, N. & Desai, S. D. **Another Outbreak of Kala-Azar in the Acworth Leper Home.** *Indian J. Med. Sci.* 1952, Nov., v. 6, No. 11, 787–91.

In previous reports [this *Bulletin*, 1950, v. 47, 337] this endemic focus of kala azar in Bombay City has been described. More cases are now reported ; 7 were discovered in 30 autopsies, and 14 others clinically. Of the latter the diagnosis was confirmed in 2 only. Out of the total of 21 new cases (confirmed and unconfirmed) 12 had been in the Acworth Leper Home for over 3 years and in 3 of these the diagnoses had been confirmed.

During the same period (April 1951–March 1952) 8 definitely diagnosed cases of kala azar were admitted to King Edward VII Memorial Hospital, Bombay ; of these 2 had never been out of Bombay province. One came from Ratnagiri district and one from near Poona. There is thus evidence that there are other foci of kala azar in Bombay province. *L. E. Napier*

Báez Villaseñor, J., Ruiloba, J., Rojas, E., Treviño, A. & Campillo S., C. Un caso de kala-azar en México. [**A Case of Kala Azar in Mexico**] *Bol. Oficina Sanitaria Panamericana.* 1953, Jan., v. 34, No. 1, 23–30, 7 figs. [15 refs.]

A case in a child of 5, believed to be the first in Mexico.

Rodhain, J. Note sur la sensibilité de *Lophuromys sikapusi sikapusi*, Temm. et *Steatomys opimus gazellae* Thom. et Hint, deux rongeurs sauvages de l'Afrique Centrale, à l'infection expérimentale par *Leishmania donovani*. [**Susceptibility of Two Wild Rodents of Central Africa to Infection with** *Leishmania donovani*] *Riv. di Parassit.* Rome. 1952, Jan., v. 13, No. 1, 89–92.

The author records the results of experimental inoculation with *Leishmania donovani* of 3 wild murid rodents from Central Africa : *Thamnomys s. surdaster*,

Lophuromys s. sikapusi and *Steatomys opimus gazellae*. While *Thamnomys* was refractory to infection, both the other species proved to be highly susceptible. The infection in *Lophuromys* ran a rapid course with a fatal termination after 3½ months, but one of the *Steatomys* survived for over 6 months. All these rodents developed visceral leishmaniasis with heavy infections of the spleen and liver. [The statement in the author's summary that " The lethal infection has a more rapid course in *S. o. gazellae* than in *L. s. sikapusi* ; the latter one may live more than six months with the infection " does not seem to be borne out in the text.] *C. A. Hoare*

See also p. 575, PRINGLE, **The Sandflies (Phlebotominae) of Iraq.**

SEN GUPTA, P. C. & ADHIKARI, S. L. **Observations on the Complement Fixation Test for Kala-Azar.** *J. Indian Med. Ass.* 1952, Dec., v. 22, No. 3, 89–93. [20 refs.]

It was discovered in 1939 that a complement-fixation test with an antigen derived from human tuberculosis gave valuable results in the diagnosis of kala azar. Later, in 1943, the original W.K.K. antigen was replaced by an antigen made from another acid-fast bacillus, the so-called leprosy bacillus of Kedrowsky, which is easily grown in large quantities ; this modification gave at least as satisfactory results. [See this *Bulletin*, 1939, v. 36, 1030 ; 1944, v. 41, 17 ; 1945, v. 42, 358 ; 1946, v. 43, 425.]

This paper reports the results of the test in over 2,400 cases ; they are divided into 3 groups :—

(*a*) Cases of kala azar in which the diagnosis had been made on the aldehyde test. Out of a total of 2,033 sera, 325 were anti-complementary. In the remaining 1,708, the complement-fixation test was strongly positive in 1,255, positive in 363, doubtful in 65, and negative only in 25 ; that is, the test was positive in 94·7 per cent. of these cases.

(*b*) Cases of kala azar in which the diagnosis had been made by the demonstration of *Leishmania donovani* : in 43 the serum was anti-complementary. In 44 the aldehyde test was not done ; of these all but 1 showed a positive complement-fixation test. In the remaining 271 cases both aldehyde and complement-fixation tests were done ; in 167 the aldehyde and in 255 the complement-fixation test was positive ; in 97 in which the aldehyde test was negative or doubtful the complement-fixation test was positive ; and in 9 cases in which the aldehyde test was positive the complement-fixation test was negative.

(c) Cases of kala azar diagnosed in the Sudan : a strongly positive or positive reaction was obtained in 21 of 23 sera.

The test was repeated 2 to 3 weeks after specific treatment in 42 cases in which a cure had been effected ; in all but 3 of these the test had been positive before treatment and it was still positive in 8, doubtful in 10, and negative in 24.

" Of the conditions other than kala-azar in which the test has been positive, lepromatous leprosy, post-kala-azar dermal leishmaniasis, actinomycosis and eosinophilic lung are not considered in the diagnosis of kala-azar and tuberculous disease (mainly pulmonary tuberculosis in 10 per cent. of cases of which positive reactions may be obtained) can be differentiated by clinical features and special methods. . . . In all other conditions the test is negative."

The complement-fixation test is more sensitive than other serum tests for kala azar, as it only gives " false positives " in conditions that are unlikely to be confused clinically with kala azar ; it is a test of great value.

L. E. Napier

Leonardi, O. & Consoli, A. Singolarità sintomatica in un caso di leishmaniosi viscerale dell'adulto. [**Unusual Symptoms in Visceral Leishmaniasis in Adults**] *Acta Med. Italica.* 1952, Nov., v. 7, No. 11, 291–5, 1 fig. [12 refs.] English summary (5 lines).

Between 1903 and 1937 there were 78 cases of adult leishmaniasis recorded in Italy, 40 of which were in Sicilians; between 1944 and 1947, when the country was under foreign occupation and the standard of hygiene was low, there was an increased incidence of practically all infective diseases and a marked rise in leishmaniasis, both in infants and adults.

The point to which the authors wish to draw special attention is the unusual mode of onset of the disease in adults. They give details of a patient, a carpenter 52 years of age. The onset of his illness was acute, with severe pain in the left hypochondrium, irregular remittent fever with afternoon rises, often preceded by shivering and succeeded by profuse sweats, with wasting, weakness, anaemia (but not severe) and some enlargement of liver and spleen. In a couple of days there ensued violent headache, especially at the vertex, and the spleen showed a rapid enlargement and signs of splenic infarct. Undulant fever was suspected but blood culture and serological examinations were negative; malaria parasites were not found, but finally sternal puncture revealed leishmaniae in large numbers. Friction sounds were audible over the spleen and left pleura. Acute purulent otitis developed 4 days after his admission. Glucantime was administered and recovery followed.

H. Harold Scott

Fidler, H. K. **Dermal Leishmaniasis. Report of a Case with Exceptionally Prolonged Incubation Period.** *Arch. Dermat. & Syph.* 1952, Dec., v. 66, No. 6, 746–8, 3 figs.

"A case of dermal leishmaniasis is reported, the main points of interest being the long incubation period, three and one-half years, the long duration of the lesion, 20 months, and the spontaneous healing of the lesion following traumatic injury."

FEVERS OF THE TYPHUS GROUP

Weyer, F. Explantationsversuche bei Läusen in Verbindung mit der Kultur von Rickettsien. [**Explantation Experiments on Lice in connection with the Cultivation of Rickettsiae**] *Zent. f. Bakt.* I. Abt. Orig. 1952, Dec. 20, v. 159, Nos. 1/2, 13–22, 4 figs. on pl.

The explantation experiments described consist of attempts to cultivate rickettsiae in living organs or tissues removed from laboratory animals or human lice and kept in hanging drops of various culture media.

Many of the "explants" consisted of the whole or part of the stomachs of lice which had been infected rectally, at least 5 days previously, with the rickettsiae under investigation. No multiplication of the rickettsiae occurred in the stomachs of lice infected less than 5 days previously, but, with suitable explants, good results were obtained especially when small fragments of fresh healthy testicles or spleens of rabbits were added to the culture media and kept in contact with infected stomachs. Excised healthy tissues such as the above mentioned, or consisting of ovaries of uninfected lice, were soaked in rich suspensions of living rickettsiae and kept in the culture media, but no

obvious multiplication occurred unless infected louse stomachs were included in the drop cultures.

Survival of rickettsiae in the cultures was tested by rectal inoculation of healthy lice and it was found that with *Rickettsia quintana* in infected louse stomachs survival could be demonstrated up to 34 days in cultures to which no fresh tissues had been added. In the same conditions *R. prowazeki* survived for 5 days and *R. mooseri* remained virulent up to 16 days in cultures to which fresh tissues had been added.

A curious feature of the cultures of *R. prowazeki* and *R. mooseri* was that after prolonged culture they ceased to multiply inside the cells but continued to multiply extracellularly, and when inoculated into healthy lice they behaved like *R. quintana* though still virulent for mice. These extracellular strains in favourable conditions could be isolated from cultures of *R. mooseri* up to 40 days and from cultures of *R. prowazeki* up to 36 days. Many modifications of the explantation tissue cultures were tried ; no less than 75 series of tests were carried out, involving the preparation of more than 1,700 drop cultures.

The study has been continued over a period of 10 years and is of great interest as a piece of basic research, though the development of the yolk-sac method of cultivation has deprived it of much of its practical importance.

John W. D. Megaw

Mooser, H. Ist *Stricheria jürgensi* Stempell 1916 ein Synonym von *Rickettsia prowazekii* Rocha Lima 1916? [**Is *Stricheria jurgensi* Stempell, 1916, a Synonym of *Rickettsia prowazeki* Rocha-Lima, 1916?**] *Zent. f. Bakt.* I. Abt. Orig. 1952, Dec. 20, v. 159, Nos. 1/2, 11–13.

The author, in a characteristically forthright note, sharply criticizes an opinion published by Dr. C. B. Philip in the *International Bulletin of Bacteriological Nomenclature and Taxonomy*, 1952, Apr., v. 2, No. 2. This opinion, which refers to the description by Stempell in April, 1916, of *Stricheria jurgensi* is as follows : " The illustrated context leaves no doubt that the intracellular organism reported in the human body louse and presumed to cause typhus fever in man was as adequately described, considering the laboratory methods available at that time, as was the following species " *Rickettsia prowazeki*, described a month later. [May, 1916, by Rocha-Lima.]

The disturbing implication is that the name *Stricheria jurgensi* has priority and that the name rickettsiosis should be replaced by stricheriosis, though Philip agrees that the long accepted names are so firmly established that they are not likely to be discarded.

The author quotes from the original descriptions by Stempell and Rocha-Lima, adding that in the illustration to Stempell's article there is nothing that could be recognized as *R. prowazeki* and that it is astonishing that Dr. Philip should identify the crystalloid structures described by Stempell with *R. prowazeki* as described by Rocha-Lima.

Special attention is called to Stempell's description of the bodies as being spindle-shaped, with sharp, often curved and flagella-like, ends ; as containing brown pigment and often one or more nuclei. *John W. D. Megaw*

Silva-Goytia, R. & Elizondo, A. Estudios sobre fiebre manchada en México. IV. Características epidemiológicas de casos de fiebre manchada ocurridos en la Laguna. [**Studies of Spotted Fever (of the Rocky Mountain Type) in Mexico. IV. Epidemiological Characteristics of Cases in La Laguna**] *Medicina*. Mexico. 1952, Dec. 25, v. 32, No. 666, 569–79. [14 refs.] English summary.

The authors studied 45 cases of " spotted fever ", seen in La Laguna from May, 1951, to October, 1952 ; 38 of the patients lived in rural areas, 7 in a town ;

37 cases occurred in the 2nd half of the year ; 26 of the patients were males, 32 were less than 15 years old, of these 9 died ; 9 were 15–39 years old, one of them died ; of the 4 patients over 40 years old 2 died. There was a history of tick bite in only one case, an unfed larval tick was found on another patient. The ticks found naturally infected in the area were *Rhipicephalus sanguineus*, *Ornithodorus nicollei* and *Otobius lagophilus*. Infected human lice were found on a patient, but lice were not thought likely to transmit infection except in a purely mechanical way. *Dermacentroxenus rickettsi rickettsi* [*Rickettsia rickettsi*] was isolated from 15 of the 28 patients who were tested by yolk-sac inoculation. The complement-fixation test was positive in the great majority of the cases; it was found more reliable than the Weil-Felix test. In the affected region 30 per cent. of the population reacted with *R. rickettsi* antigen but none with *R. prowazeki* antigen. It was suspected that many mild or inapparent cases occur in childhood, and that there are several modes of transmission.

John W. D. Megaw

Anigstein, L. & Packchanian, A. **The Transient Viability of the Spotted Fever** *Rickettsia* **in** *Triatoma gerstaeckeri*. *Texas Reports on Biol. & Med.* 1952, v. 10, No. 4, 761–7. [16 refs.]

" *Dermocentroxenus rickettsii* remained virulent in *Triatoma gerstaeckeri* at least nine hours. Guinea pigs inoculated within this period following the infective blood-meal showed typical symptoms of spotted fever, died, or developed immunity against the disease.

" Guinea pigs inoculated with *Triatoma* one, two, four, six, eight, nine, 34, 233, and 255 days after the infective blood-meal, failed to develop any symptoms or immunity against *D. rickettsii*. All the animals survived.

" It is concluded that *T. gerstaeckeri* do not play any primary role in the transmission of spotted fever."

Marmion, B. P., Stoker, M. G. P., McCoy, J. H., Malloch, R. A. & Moore, B. **Q Fever in Great Britain. An Analysis of 69 Sporadic Cases, with a Study of the Prevalence of Infection in Humans and Cows.** *Lancet*. 1953, Mar. 14, 503–10, 4 figs. [29 refs.]

The first serological evidence of the occurrence of Q fever in Britain and the first confirmed cases of the disease in that country were reported as recently as 1949 [see this *Bulletin*, 1949, v. 46, 454 ; 1950, v. 47, 226]. Three outbreaks have already been described in which 48 persons were attacked [*ibid.*, 1952, v. 49, 385 ; 1953, 50, 299] and the authors now give a comprehensive summary of the chief features of 69 sporadic cases ; 58 of these were typical attacks most of which resembled atypical pneumonia. The highest incidence was in Kent where 32 of the patients were infected, otherwise the infection was widely and irregularly distributed over England and Wales.

Only 11 of the patients were females and only 3 were less than 20 years old. The diagnosis in 68 cases was based either on a 4-fold or greater increase in the complement-fixing titre or on a titre of 1–64 or higher after the illness. There were 4 deaths, which occurred 11, 23, 110, and more than 190 days, respectively, after the onset ; the ages of these patients were 78, 45, 58, and 37 years; the one in whom death was delayed " may have had chronic Q fever ". Among the 48 cases in the outbreaks there was only 1 death.

All the outbreaks and about two-thirds of the sporadic cases occurred in the months of April to September, inclusive. In 20 of the sporadic cases no obvious source of infection could be suspected ; 22 patients might have been infected by living in or near a dairy farm and 10 others by proximity to a glue factory

to which whole carcases, bones and other parts of cows and sheep were constantly being brought. None of the persons employed in the factory was attacked but most of them had worked there for many years and so might have been immune.

Raw milk was drunk by 28 patients ; the supply to 20 of these was examined and Q fever organisms were isolated from 10 ; of the samples in 4 other cases the herds from which the milk came were serologically positive.

A widespread survey was made of the incidence of Q fever antibodies in the sera of healthy donors of blood from various parts of England and Wales. The percentages of sera found positive at titres of 1–10 or higher were :— in northern England 2·6 per cent. of 505 sera ; in Wales 1·85 of 489 sera ; in East Anglia, 0·78 of 1,418 sera, and in South-East England 2·96 per cent. of 1,956 sera.

Milk from 1,031 herds of cattle were tested ; in Kent 8·2 per cent. of the herds were excreting *Rickettsia burneti* ; in Devon the percentage was 2·7 and in East Anglia only 0·85.

In serological tests of individual cattle no positives were found among 170 cows in Suffolk and Hertfordshire, but there were 3·5 per cent. among 489 cows in Devon.

Among 23 batches of ticks that were tested by guineapig or mouse inoculation there were only 2 positives, and these were regarded as doubtful ; they were among batches made up of *Haemaphysalis cinnabarina* from North Kent, where this was the only tick found. The other batches tested consisted of 1,800 *Ixodes ricinus* from Devon, Cumberland and Scotland, and 15 *Dermacentor reticulatus* from Devon.

This paper should be read by every medical man in the British Isles, where it seems likely that 1–2 per cent. of the adult population have suffered at some time from attacks of Q fever, very few of which have been recognized.

John W. D. Megaw

Giroud, P., Boidé, D., Humann, H. & Faucheux, R. Deux épidémies de fièvre Q, le rôle des poussières. [**Two Outbreaks of Q Fever ; the Part Played by Dust**] *Bull. Acad. Nat. Méd.* 1953, v. 137, Nos. 1/2, 29–31.

The authors describe 2 outbreaks of Q fever in France to which reference has already been made in a previous paper [see this *Bulletin*, 1953, v. 50, 300].

In both outbreaks the source of infection was almost certainly dust inhaled while handling mail bags contaminated by being carried in railway trucks or motor lorries in which cattle had been conveyed.

In one outbreak, at Moulins, the only persons attacked were 31 of the 53 persons employed in the postal sorting department. In the outbreak at Montlucon 12 of the 55 persons employed in the sorting department were attacked and so was a man who handled the mail-bags at the railway station. No cases occurred among persons who came into contact with the patients.

Serological tests of animals at Moulins gave the following results :—12 cattle, of which 1 was positive ; 10 sheep, with 2 positives ; 22 pigs, with 4 positives, and 6 dogs, with 1 positive.

John W. D. Megaw

Onul, B. & Uysalefe, D. **The Value of the Skin Test in Q-Fever Infection.** *Türk Ijiyen ve Tecrübî Biyoloji Dergisi.* Ankara. 1952, v. 12, No. 3, 192–3. [German version 194–5, French version 196–7 & fuller version in Turkish 185–91.]

The authors, from Ankara, describe their results with an intradermal test for Q fever. The antigen was prepared from egg cultures and preserved in the

refrigerator, with added chloramphenicol. The emulsion used was diluted 1/100 and 0·1 cc. was injected intradermally. As a control, the authors used the supernatant fluid of a similarly diluted emulsion which had been centrifuged at 6,000 r.p.m. for 1 hour. The results were read in 12 to 24 and in 72 hours. Those who had not suffered from Q fever showed small white papules, becoming reddish and disappearing in 6–8 hours. Occasionally a reddish area of not more than 5 mm. in diameter persisted, but it usually disappeared: it also occurred when the control fluid was used and was regarded as a non-specific toxic reaction.

With a true positive reaction, a similar appearance was seen in 10 to 12 hours, but during the next 12 hours an infiltrative erythema occurred and reached 5–6 cm. in diameter. This reached its maximum in 40 hours and thereafter disappeared slowly. Positive reactions were always more than 3 cm. in diameter, while "toxic" reactions were always less than 5 mm.

Some persons having had Q fever a few years before, suffered from general reactions. Strong reactions, in which the erythematous area was 6–8 cm. in diameter, were sometimes accompanied by a central area of induration after 48 hours: this persisted for some time and took "a few weeks" after the erythema had disappeared to be absorbed.

Positive reactions were obtained on the 3rd to the 8th day of illness: they could be induced for at least 4 years afterwards and the authors consider that reactivity might be permanent, thus requiring caution in interpreting them during subsequent illnesses.

Complement-fixation tests carried out in parallel gave comparable results, but diagnostic titres were not obtained for some weeks and did not persist for more than 18 months, usually less. It is therefore suggested that the skin test is a useful and practicable method for the early diagnosis of Q fever.

H. J. O'D. Burke-Gaffney

Meyer, A. & Naveau, P. P. Images radiologiques nodulaires des poumons consécutives à une infection vraisemblablement rickettsienne. [**Nodular Infiltration of the Lungs after an Infection which was probably Rickettsial**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1952, Nos. 34, 35 & 36, 1256–60, 2 figs. [10 refs.]

A case is described in which a diffuse nodular infiltration of the lungs persisted for more than 6 months after an attack of fever which was believed to be Q fever [wrongly called "*fièvre de Queensland*"].

The patient was one of 4 persons who explored a vast grotto in Martinique and found it swarming with bats whose droppings were falling like rain. Less than 2 weeks later all the explorers were attacked with fever which lasted 2–3 weeks and was accompanied by a dry cough. The only physical signs were a few pulmonary râles. The patient and one of his companions gave a positive rickettsia-agglutination reaction with *Rickettsia burneti* at a titre of 1–40. X-ray photographs of the patients at the time of the illness showed diffuse small nodular infiltrations of the lungs. In photographs taken a month later the nodules had disappeared except in the case of the present patient in whom they had originally been most pronounced. Six months later this patient was found to have a diffuse infiltration of both lungs consisting of nodules about 1·0 cm. in diameter. Even after a year there were still distinct traces of the infiltration. The association of the condition with the febrile attack was confirmed by the fact that a radiogram taken shortly before the illness had been quite normal.

John W. D. Megaw

DENGUE AND ALLIED FEVERS

Inoki, S., Moriya, S. & Kobayashi, R. **Immunological Studies on Dengue Fever with special reference to the Neutralization Tests conducted of both Reconvalescent Human and Immune Animal Sera.** *Med. J. Osaka Univ.* 1952, Aug., v. 3, Nos. 2/3, 347–56, 1 fig.

These studies are stated to have been carried out in 1943 and to have been published in Japanese before the preliminary note on the subject was published by Sabin *et al.* in 1944 [see this *Bulletin*, 1945, v. 42, 891].

The authors describe neutralization tests with mouse-adapted dengue virus on sera of human convalescents, rabbits, and goats. Neutralizing antibodies were found to persist for at least 8 months in sera of human convalescents ; they were also present in high concentration in sera of rabbits immunized by mouse-brain dengue virus, but in low concentrations in immune-goat serum. An inconclusive series of experiments suggest that the immune-rabbit serum confers some degree of protection to mice against inoculation with the virus.

John W. D. Megaw

Bailey, S. F. & Bohart, R. M. **A Mosquito Survey and Control Program in Guam.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 947–52, 1 fig.

During the second World War, the American forces attacked the island of Guam in the Marianas Group in July 1944 and occupied it by August 10th. According to the inhabitants the Japanese had practised no mosquito control during their 31 months' possession of the island. The resulting high mosquito population found added opportunities for breeding among the debris resulting from the fighting and, in the wet season following the U.S. occupation, there was a severe epidemic of dengue fever. This gradually declined from September 1944 onwards as the percentage of immune individuals increased and the rainy season ended. However, in January and February 1945 a mosquito survey was undertaken and vigorous control measures were instituted to prevent a resurgence of the epidemic in the following rainy season, among newly arrived susceptible troops.

Altogether, 9 species of mosquito were discovered, most of them having been recorded in earlier surveys. The most common were *Culex fatigans* (80 per cent. of 115 collections) and *Aëdes aegypti* (50 per cent.) breeding in artificial containers close to human habitations. Most frequently infested larval sites were : wooden buckets, bamboo sections, crockery, clean oil drums and discarded tyres. Further away from habitations, *C. guamensis* was often found (9 per cent.). *C. annulirostris mariannae* and *Aëdes vexans nocturnus* occurred in fresh water pools and *Aëdes pandani* larvae occurred in water in *Pandanus* leaf axils.

Aëdes aegypti was clearly acting as a vector for dengue and the primary control objective was to reduce or eradicate this mosquito. Permanent control measures included the clearing of bomb wreckage and elimination of breeding sites in military supply dumps, the filling of tree-hole breeding places with earth, and the clearing of tin cans and similar refuse from the vicinity of the islanders' homes. Attempts were then made to check breeding in barrels containing rain water for drinking in villages. After some experiments, the most effective method found was to cover the barrels with 30-inch squares of burlap (from old sacks, etc.) which had previously been treated with DDT in xylene (5 per cent. emulsion concentrate). The small traces of DDT falling into the water, or washed in by rain, effectively stopped breeding for 3 to 5 months.

These control measures were gradually extended to the whole island by training 5 parties of about 40 islanders, properly equipped and supervised by naval personnel.

As the control of *Aëdes aegypti* was successfully accomplished, dengue fever dropped to zero, and according to later surveys the vector was completely eradicated. Subsequently attention was turned to nuisance mosquitoes causing trouble by their bites. *C. fatigans* which breeds in polluted domestic water was difficult to destroy by insecticide and could only be eliminated by proper drainage. *Aëdes vexans nocturnus* was readily controlled by DDT-larvicide, but *Aëdes pandani*, in the inaccessible leaf axils of the screw palm, proved difficult. The only remedy appeared to be aerial spraying, which gave some relief for about a week.

J. R. Busvine

RABIES

Tendeiro, J. Um foco de raiva nos cães de Bissau. [**A Focus of Canine Rabies in Bissau (Portuguese Guinea)**] *Bol. Cultural Guiné Portuguesa.* 1952, Apr., No. 26, 297–306, 4 figs. on 2 pls.

In February–April 1951 a number of cases of rabies in the dogs of Bissau and its environs were seen. The disease has many local synonyms ; the author mentions 10 of them. The first animal was seen on 21st February, very restless, taking neither food nor drink but biting viciously at everything within reach. It died the next day. Search for Negri bodies was inconclusive but the diagnosis was confirmed by inoculations. Eleven others followed, making 12 cases in all ; 10 suffered from the rabid form, 2 from the paralytic. A thirteenth is mentioned as coming under suspicion, having bitten a son of the owner, but the infection was not confirmed and the biting is ascribed to " natural aggressiveness ".

Animal inoculations were made into guineapigs, rabbits, white rats and a macaque (*Papio papio*). The usual announcements and warnings were issued by the Public Health Department : registration and licensing of all dogs, use of a collar with the name of the owner for identification, reporting and observation of all dogs behaving peculiarly, vaccination of all dogs over 3 months old (61 were vaccinated), keeping dogs on a lead when taken out, capture of all stray dogs and cats, detention of suspects and of vaccinated dogs bitten by rabid ones, and the killing of rabid animals.

H. Harold Scott

Horrenberger, R. Recherche du virus rabique chez les rats de la ville d'Alger. [**Investigation of Rats in Algiers for the Presence of Rabies Virus**] *Arch. Inst. Pasteur d'Algérie.* 1952, Dec., v. 30, No. 4, 371–6. [11 refs.]

The purpose of this investigation was to determine what rôle rats played in the spread of rabies in Algiers. Rats were captured alive and killed by sulphur dioxide which also destroyed the ectoparasites. After suitable treatment their brains were inoculated intracerebrally into guineapigs. Some 805 rats were thus dealt with but no infection was set up in the guineapigs. Rats have never been implicated in a case of human rabies but they may play a part in the spread of the disease to dogs and other domestic animals.

J. Carmichael

Reagan, R. L., Day, W. C., Moore, Suzanne, Kehne, Ellen F. & Brueckner, A. L. **Response of the Syrian Hamster to Two Strains of Rabies Street Virus by Rectal Instillation.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 70–73.

"Two strains of rabies virus isolated from dog brains, one (V308) passed three times in Swiss albino mice and the other (V644) passed twice in Swiss albino mice, have been successfully transmitted rectally for 5 serial passages in the Syrian hamster. Organs (heart, liver, lungs, spleen, kidneys, intestines and feces, brain, spinal cord) from the fifth serial passage of each strain were inoculated rectally and intracerebrally into hamsters. Regardless of the route of inoculation all organs tested were infective except the pooled feces and intestines.

"These two strains of rabies street virus produced paralytic rabies in hamsters when the virus was administered rectally."

Chambon, Y. & Galea, M. Syndrome hématologique du rat blanc inoculé de virus rabique fixe. [**Haematological Syndrome in White Rats Inoculated with Fixed Rabies Virus**] *Ann. Inst. Pasteur.* 1952, Dec., v. 83, No. 6, 774–80. [14 refs.]

A study of the blood changes which occur in the white rat following the inoculation of a fixed rabies virus showed a reduction in eosinophiles and mononuclears with an increase of polymorphonuclears and a general leucocytosis.

These changes are seen one or two days before paralytic symptoms are noticed and are thought to be due to a stimulation of the suprarenal cortex after intracerebral inoculation of virus. *J. Carmichael*

Chambon, Y. & Galea, M. Action de la surrénalectomie chez le rat blanc inoculé de virus rabique fixe. [**Action of Adrenalectomy on White Rats Inoculated with Fixed Rabies Virus**] *Ann. Inst. Pasteur.* 1952, Dec., v. 83, No. 6, 781–5. [12 refs.]

The authors have carried out experiments which show that in white rats which have had their suprarenals removed there are not the characteristic blood changes [above] which occur after inoculation with rabies virus. The incubation period and the period of survival are both shortened in suprarenalectomized rats and the authors conclude that the suprarenal cortex is concerned in the defence mechanism against infection with the rabies virus. *J. Carmichael*

PLAGUE

Sáenz Vera, C. La peste en el Ecuador durante el año 1951. [**Plague in Ecuador in 1951**] *Bol. Oficina Sanitaria Panamericana.* 1952, Dec., v. 33, No. 6, 621-8, 2 figs.

The author describes the incidence, distribution and control measures in connexion with plague in Ecuador in 1951, when the number of cases was 35 as compared with 28 in 1950. The affected area amounted to about 1,800 square kilometres; it consisted of rural or sylvatic zones in the region between the Andes mountain ranges.

The epidemiological features of the disease are not discussed but the table showing the distribution suggests that most of the cases were of the wild-rodent or sylvatic type of infection. There were 10 cases in one locality but the remaining 25 cases occurred in 13 different places, in 7 of which only one case was reported.

Control measures were applied to a much larger area of more than 124,000 square kilometres with a population of over 2½ million. The rodents destroyed were, in round numbers, 236,000 trapped ; 82,000 poisoned by Cyanogas ; and 138,000 poisoned by fluoroacetate of soda. The trapped rodents that were identified included 100,000 *Rattus norvegicus*, 33,000 *R. rattus* ; 31,000 *R. alexandrinus* ; 61,000 *Mus musculus* ; and more than 1,000 *Akodon mollis*. Among 94,000 rodents examined by autopsy only 4 were found infected. Nearly 19,000 guineapigs were destroyed ; among 769 of these that were autopsied, 23 were " positive ".

Many other figures are given without comment in a list giving particulars of the preventive measures adopted ; these are of the usual kind ; they include the application of more than 20,000 lb. of 10 per cent. DDT dust. The most interesting procedure was a trial of " Warfarin ", a dicoumarol preparation highly lethal to rats because of its anticoagulant property [see this *Bulletin*, 1952, v. 49, 509, 510]. Eleven pounds of poison, which is described as a 5 per cent. powder, were mixed with enough maize meal to make 1,100 lb. of bait which was distributed in receptacles, each containing 3 oz., in a small town of about 3,000 inhabitants. The tins of bait, numbering 3,078, were replenished when necessary. From the 4th day dead rats were found in numbers which rapidly increased till about the 10th day when more than 800 were collected ; thereafter the number diminished gradually, and after 7 weeks, when the supply of bait was exhausted, only 6 dead rats were found daily. The experiment is regarded as having yielded splendid results and as giving grounds for hoping that a successful campaign of rat destruction on a national scale will become possible.

John W. D. Megaw

DUBEY, V. D. **Streptomycin in Bubonic Plague.** *J. Indian Med. Ass.* 1953, Mar., v. 22, No. 6, 250–52.

In the course of a fairly severe outbreak of bubonic plague in 2 villages of Uttar Pradash, India, the author successfully treated 18 patients with streptomycin. With the exception of symptomatic therapy, and local applications to the buboes, this was the only treatment given to 16 of the patients : the other 2 had, in addition, some treatment with sulphatriad.

The patients were aged 8 to 40, but only 4 were under 10 years. The dose of streptomycin was 1 gm. in 2 cc. distilled water, given intramuscularly : the children received half this amount. In only 4 cases was it necessary to repeat the dose and when this was done, it was given after 24 hours. Details of these 4 patients are given, and the findings in the case of all 18 patients are tabulated.

The fever and toxaemia subsided in 24 to 48 hours, after which the patients felt better : the course of the disease was shortened and the author considers that there is no need to continue the treatment with streptomycin after the temperature has come down to normal. It is noted that when the dose was repeated, it was done at a longer interval than in the series reported by GHOSH [this *Bulletin*, 1951, v. 48, 461] who repeated the injections every 12 hours.

The patients had been ill for 6 to 72 hours when treatment began. The average time taken for the buboes to subside was 7·5 days : it was 6·8 days in most of the patients, but 10 in the four requiring a total of 2 gm. of streptomycin. No suppuration occurred and incision of buboes was not required.

One patient who was delirious and had a temperature of 103°F. became apyrexial after 1 gm. of streptomycin and was mentally clear next day.

There were no toxic manifestations with the use of streptomycin, and no sign of resistance to it. The author considers that this form of treatment is convenient, economical and suitable to rural areas.

H. J. O'D. Burke-Gaffney

CHOLERA

HUSSEIN, A. G. **Epidemiology of Cholera in Egypt.** Reprinted from *Med. Press of Egypt.* 1949, Dec., v. 60, 44 pp., 21 charts. [15 refs.]

POLLITZER, R. **A Note on the Incidence and Epidemiological Importance of Cholera Carriers.** *Bull. World Health Organization.* Geneva. 1952, v. 7, No. 3, 359–69. [26 refs.]

The findings on the periods over which convalescents and contact ("healthy") carriers continue to excrete *V. cholerae*, which have been published since 1935, are reviewed, this period being selected in view of the introduction of reliable methods for identification of the cholera vibrio, at the time. The findings are summarized in four tables which give (a) the maximal periods of vibrio excretion in convalescent carriers reported by different authors, (b) the average duration of vibrio excretion by convalescents, (c) the maximal periods of excretion by contact carriers, and (d) the incidence and average duration of excretion by contact carriers.

Considerable differences are shown in the findings of different observers and a full interpretation of the results would require a study of the individual reports dealt with.

The maximum periods of excretion by convalescent carriers reported vary from 13 days to 42 days. The percentages of patients continuing to excrete the vibrio for different periods also varies widely. For example READ and PANDIT reported 7 out of 10 negative within 6 days, and the remaining 3 negative within 13 days, while SHOUSHA found 56 per cent. positive up to 10 days and 29 per cent. positive up to 20 days. YING found 76·5 per cent. positive up to 7 days and 21·5 per cent. up to 10 days.

The maximal figures for vibrio excretion by contact carriers which are reported vary from 7 to 26 days, and it appears that they excrete for a shorter period than convalescents. In the majority of cases contacts no longer excrete after 10 days and half or more are negative after 5 days.

The author, in discussing the epidemiological significance of cholera carriers, notes that actual records of infections produced by carriers are few and not well documented and that by investigations in India it was not possible to detect a carrier before the onset of a case of cholera in the vicinity. Reference is also made to the findings of NICHOLLS in Ceylon [this *Bulletin*, 1935, v. 32, 763]. In the examination of stools from over 100,000 seasonal labourers, vibrios were found on 84 occasions and it is estimated that at least 200 carriers must have arrived in Ceylon in a year of average immigration. There were, however, in the period 1924–33, only 10 occurrences of cholera, 9 of which were traced to incubatory carriers, the origin of the tenth outbreak not being elucidated. In this connexion the finding of BRUCE WHITE that vibrios excreted during convalescence from cholera tend to show changes, is quoted. "At the end of the disease and during convalescence an increasing proportion of the vibrios excreted by the patient are in the process of 'roughening' or are entirely rough. Transformation from the smooth to the rough state corresponds to a loss of pathogenicity of the organism."

It is concluded that epidemiological observations as well as laboratory studies render it unlikely that such carriers are the source of infection. " There seems, therefore, no reason to revise the opinion, held by most experts with experience in areas where cholera is endemic or frequent, that only ' acute ' carriers, that is, individuals late in the incubation stage, those actually ill, and possibly also those in early convalescence, are instrumental in spreading the infection." [See also this *Bulletin*, 1953, v. 50, 305.] *J. Taylor*

GILMOUR, C. C. B. **Period of Excretion of *Vibrio cholerae* in Convalescents.** *Bull. World Health Organization.* Geneva. 1952, v. 7, No. 3, 343-51. [18 refs.]

An investigation was carried out in Calcutta in 1950 on the period over which a cholera convalescent continues to excrete the vibrio. Between 2nd March and 30th June over 7,500 cases of suspected cholera occurred and with the consequent pressure on bed space it became impossible to continue observation up to the period of 35 days originally proposed.

For the purpose 20 beds were allocated in the Campbell Hospital, patients in half the beds receiving sulphaguanidine treatment. A total of 253 patients were examined of whom 63 were negative on culture and were discarded. Of the remaining 190, 61 died—a mortality of 32 per cent.—and 16 absconded, leaving 113 for the investigation.

Cultural examinations were made both by direct plating and by enrichment in a modified Wilson and Blair medium. A comparison of the findings showed that 16·1 per cent. of cases would have been missed without the enrichment. Of the 190 cases 122 were Ogawa infections, 65 Inaba and 3 mixed. Out of the 113 followed, 71·6 per cent. were negative after the first week, 89·3 per cent. after the second week and 98·1 per cent. after three weeks.

The results are compared with those reported by YING [this *Bulletin*, 1941, v. 38, 585] who found 98 per cent. negative at the end of the second week and 99·5 per cent. negative at the end of the third week.

The longest periods of unbroken daily excretion were :

Days	Number of cases
15	1
13	1
8	4
7	16
6	17
5	13

The number of patients who excreted continuously, or with only one negative culture between two positives, and were thereafter negative was 92, as follows :

No. of cases	Period of continuous excretion (days)	No. of cases	Period of continuous excretion (days)
6	2	3	8
16	3	3	9
15	4	1	10
14	5	1	12
17	6	1	13
14	7	1	21

The longest period of excretion found, excluding obvious cases of reinfection, with some negative days between isolations were one case each up to 20, 21, 23 and 25 days respectively.

The risk of reinfection or cross-infection under the conditions of nursing are recognized. This is suspected to have occurred because an organism of different serological form from that originally found was isolated at a later stage from the stools of some patients. This was noted in 4·4 per cent. of the cases, and it is possible that sub-clinical reinfection may also occur in quarantine camps and in endemic areas. [Sub-clinical reinfection may account for the very prolonged periods of excretion which have sometimes been reported. The paper deserves careful study by those interested in the epidemiology of cholera.]

J. Taylor

Dudani, A., Iyer, S. N., Krishna Murti, C. R. & Shrivastava, D. L. **Dehydrogenation of Various Substrates by** *Vibrio cholerae*. [Correspondence.] *Nature*. 1953, Jan. 10, v. 171, 81–2.

The dehydrogenase activity of an Ogawa form of *V. cholerae* and of the Inaba, and the Rough variants derived from it, was studied as part of an investigation on the enzyme make-up of the organism. On a series of 3 groups of substrates, the details of which are given in a table, the dehydrogenase activity was found to fall into 3 groups, namely—

Group A : Rough > Inaba > Ogawa
Group B : Rough > Inaba ∿ Ogawa
Group C : Rough ∿ Inaba > Ogawa

This is stated to be in contrast to the pattern observed in deamination wherein the activity is in the order Ogawa—Inaba—Rough. The faster rate of dehydrogenation in the converted variants (Inaba and Rough) is taken to indicate higher metabolic activity and would suggest the loss of some factor present in the parent form during the transformation. *J. Taylor*

Koch, W. & Kaplan, Deborah. **A Cholera Medium with more than Tenfold Yield.** *Bull. World Health Organization*. Geneva. 1952, v. 7, No. 3, 353–6.

Investigations were carried out on the yield of *V. cholerae* by culture in different media. Cultures were made in 50 ml. flat-bottomed flasks in which 5 ml. of a 2·5 per cent. agar medium at *p*H 7·6–7·8 were dispensed, the nutrients in the medium being varied and the yields compared with those in an arbitrary standard medium.

The reference standard medium contained Difco peptone 1 per cent., sodium chloride 0·5 per cent., agar 2·5 per cent. Harvesting was carried out after 22–24 hours' incubation by rinsing the flask with 20 ml. saline solution containing 0·01 per cent. merthiolate, the suspension then being heated in a water bath at 56°C. and the growth estimated turbidimetrically.

The media of which the yield was compared contained various admixtures of peptone, casein hydrolysate, disodium hydrogen phosphate, glycerol, Bovril and Marmite. The heaviest growth was obtained in a medium containing 0·5 per cent. peptone (Difco), 0·5 per cent. casein hydrolysate (Squibb), 0·5 per cent. sodium chloride, 0·25 per cent. disodium hydrogen phosphate, 0·15 per cent. Bovril, 0·15 per cent. Marmite, 2·2 per cent. glycerol and 2·5 per cent. agar. The yield on this medium was more than twelve times that on the plain peptone reference standard medium. Glycerol and sodium dihydrogen phosphate together had a strong enhancing effect on growth. *J. Taylor*

GHOSAL, S. C. & PAUL, B. M. **The Value of Bandi's Test in the Rapid Diagnosis of Cholera.** *Bull. World Health Organization.* Geneva. 1952, v. 7, No. 3, 371–3.

The value of Bandi's method for the rapid diagnosis of cholera was tested. This consists of inoculating suspected material into a tube of peptone water at *p*H 8·2, to which high-titre cholera O serum has been added. If growth of *V. cholerae* takes place granules produced by agglutination will appear in the body of the fluid and on the sides of the tube and may be observed after 3–7 hours' incubation.

A comparison was made between the results of the test and culture on modified Wilson and Reilly medium and on bile-salt agar. Out of 158 stools yielding positive results 62 per cent. were positive by both Bandi's test and by culture, and 38 per cent. were positive by culture and negative by Bandi's test. No improvement was obtained by raising the *p*H for the test to 9·2. The results with Bandi's method became less and less accurate as the proportion of vibrios to other organisms decreased.

It is concluded that the test may be useful where there is a preponderance of vibrios in the material under examination, but it is not reliable when other organisms predominate. *J. Taylor*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

RICCI, M. Ricerche parassitologiche nell'isola d'Ischia. III.—Il parassitismo intestinale nella popolazione infantile. [**Parasitological Surveys in the Island of Ischia. III. Intestinal Parasites in the Child Population**] *Riv. di Parassit.* Rome. 1952, Oct., v. 13, No. 4, 265–76. English summary.

Two previous papers by this author gave the results of a search for *Enterobius vermicularis* carried out at the beginning and at the end of the school year 1951–52 in children aged 1–12 years [presumably some of these had not yet been to school] [see this *Bulletin*, 1952, v. 49, 710 ; 1953, v. 50, 327].

In the survey now reported, also carried out in May and June, 1952, the author has searched the stools of 275 children aged 1–12 years and found 13 different species of parasites, of which 8 were protozoa and 5 helminths. A total of 88·73 per cent. of all the children examined showed one or more infections. There was no appreciable difference in the infestation rate of the two sexes (151 were boys) but age seems to be an important factor ; a rate of 69·81 per cent. in those aged 1–5 years compared with one of 93·24 per cent. in children aged 6–12 years. The survey covered 3 towns and the infection rates found were 94·05, 87·38 and 85·23 per cent. respectively.

Entamoeba coli was found in 11·27 per cent. of the children ; and also *E. histolytica* var. *minuta* (1·45) ; *Iodamoeba bütschlii* (7·64) ; *Endolimax nana* (1·09) ; *Chilomastix mesnili* (1·45) ; *Retortamonas intestinalis* (11·64); *Trichomonas hominis* (1·09) ; *Giardia intestinalis* (22·55) ; *Hymenolepis nana* (2·18) ; *Ascaris lumbricoides* (39·64) ; *Enterobius vermicularis* (6·18) ; *Necator americanus* (0·36) ; and *Trichuris trichiura* (80·73) per cent.

Taenia saginata is known also to be fairly common in the child population of the island.

In 615 of the subjects (67·62 per cent.) several species of, 2 to 5, parasites were found in each child.

The author tabulates many details and states the various laboratory techniques which he has followed in this survey. *J. Cauchi*

Neghme, A., Silva, R. & Alvarez, M. Encuesta enteroparasitaria en el extremo austral de Chile. [**Survey of Intestinal Parasites in the Southernmost Area of Chile**] *Bol. Informaciones Parasitarias Chilenas.* 1952, Oct.–Dec., v. 7, No. 4, 61–3.

The English summary appended to the paper is as follows :—

" The authors have performed coprological surveys in samples of the population of the most austral parts of Chile, from 51° 45′ S. latitude to 55° S. latitude. They found 5·93% with *Entamoeba histolytica* ; 9·7% with *Giardia lamblia* ; 1·34% with *Ascaris lumbricoides* ; 14·55% with *Trichuris trichiura* ; 1 person with *Hymenolepis nana* and 2 with *Taenia* sp. over 371 examined."

See also p. 584, Loures & Bastos, Resultado e considerações sôbre 250 exames de fezes. (Parasitoscópico e bacteriológico.) [**Results and Notes on 250 Bacteriological and Parasitological Examinations of Faeces**]

Rizzotti, G. Contributo allo studio della varietà piccola dell'*Entamoeba histolytica*. [**Study on the Small Variety of** *Entamoeba histolytica*] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, June, v. 33, No. 6, 299–312. English summary.

As there is still some controversy regarding the biology and host-parasite relationship of the small race of *Entamoeba histolytica* (also known as *E. hartmanni*), the author records his observations on this subject carried out in the course of 4 years (1948–1951) in Addis Ababa. Out of a total number of 442 persons infected with *E. histolytica*, 32 (7·2 per cent.) harboured the small race, distinguishable by cysts and trophozoites not exceeding 11 μ and 17 μ respectively in diameter. The amoebae and their cysts were found in stools obtained after administration of saline purgatives in all cases but one, in whom diarrhoea was present. In addition to this case, two other patients were suffering from minor intestinal disorders, whereas in the remaining cases the infection was symptomless. In the 3 patients, treatment with emetine eliminated the amoebae and caused the disappearance of symptoms, which were attributed to infection with the small race of parasite. However, there was no evidence of ingestion of red blood corpuscles by the amoebae, the cytoplasm of which usually contained bacteria.

Faecal material from one of the 3 patients was inoculated intracaecally into 2 rabbits, and from these into 2 others. In all these animals the infection gave rise to inflammatory and ulcerative lesions in the caecum and appendix, the contents of which contained numerous small amoebae, differing from those in the donor-patient only in the presence in some of them of ingested red cells. *C. A. Hoare*

Donoso I., A., Amenábar C., E., Zacarías G., A. & Rojas, G. Consideraciones anátomoclínicas sobre las causas de muerte en la amebiasis. [**Pathological Findings as to the Causes of Death in Amoebiasis**] *Rev. Med. Chile.* 1952, July, v. 80, No. 7, 413–17.

The aim of the authors' study was twofold : to determine the cause of death of patients with amoebiasis and to correlate the clinical diagnosis with the anatomical findings, at the same time investigating the erroneous diagnoses and their causes. They have reviewed all the autopsies performed at the Hospital San Francisco de Borja in the period from November 1932 to April 1952, nearly 20 years. Among the total 10,910 autopsies they found 90 (8·24 per mille) with typical lesions in the bowel ; they excluded all which did not present the classical lesions. They concluded that the amoebiasis was

the actual cause of death in 80, and present as a concomitant disease in 10. Amoebiasis was diagnosed clinically in 22 (24·4 per cent.), wrongly diagnosed in 42 (46·6) and " incomplete " in 26 (28·8). By " incomplete " they imply cases in which lesions were present but the cause was not clear, such as severe or chronic colitis.

They found that amoebiasis was the actual cause of death in 80 ; in 23 it was due to perforation, single in 11, double in 7, multiple in 5. The sites of perforation were caecum 9, sigmoid 8, descending colon 5, transverse colon 3, left flexure 2, ascending colon and right flexure one each. Liver abscess was present in 22 ; in 3 it had ruptured and caused general peritonitis. In 6 cases the termination of the ileum was involved and one had amoebic endometritis. Errors of diagnosis are ascribed to failure of the medical attendant to recognize the condition, either from want of knowledge or, on the other hand, diagnosing amoebiasis on too slight suspicion ; secondly, to ignorance of the varied clinical symptoms to which the infection may give rise ; thirdly, to wrong interpretation of the endoscopic appearances unless they are absolutely typical, and, fourthly, to failure to recognize the *Entamoeba* when making a faecal examination.

H. Harold Scott

Floch, H. Abcès du foie amibiens et abcès du foie microbiens. [**Amoebic and Bacterial Abscesses of the Liver**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 6, 799–811. [12 refs.]

The cause of liver abscesses in the tropics is often assumed invariably to be amoebiasis, though parasites are not often found in the pus from the lesions. The mere fact that the pus is chocolate-coloured in the absence of amoebae does not warrant the lesion being called an amoebic one. An apparent response to emetine treatment equally does not justify a diagnosis of hepatic amoebiasis. The French literature on the subject has been contentious [and even acrimonious].

The author, at the Pasteur Institute in French Guiana, has examined specimens of pus obtained from nearly all the liver abscesses occurring in the colony during the last 13 years. In only one of the 11 specimens examined were amoebae found, and from 6 specimens bacteria were recovered which were considered to be responsible for the condition. In his opinion amoebiasis is by no means the predominant cause of liver abscess in the tropics.

A. R. D. Adams

Erratum

In the abstract of the paper by Chakravarti in this *Bulletin*, 1952, v. 49, p. 955, the dose of emetine shown in the second line of the eighth paragraph should read " 15 grains " and not " 15 gm.".

Armstrong, T. G. **Recent Experiences in the Treatment of Amoebiasis.** *South African Med. J.* 1953, Jan. 10, v. 27, No. 2, 42–4.

This paper is really a summary of the experience of the author and his colleagues in the examination of a wide range of drugs in the treatment of amoebic dysentery in Africans in Natal, S. Africa [this *Bulletin*, 1949, v. 46, 259, 831 ; 1950, v. 47, 241, 628, 994 ; 1952, v. 49, 1120]. It does not lend itself to further summary, and it should be consulted in the original by those interested in the subject. A few deductions are worthy of note here. The author has once again established the fact that the older-type pills of E.B.I. are ineffective because the contents are not liberated and diffused, but after crushing or,

better, incorporation in a new proprietary enteric-coated tablet they rank as one of the most effective amoebicides. E.B.I., however, it is stated, is not well tolerated by the African, in whom it causes diarrhoea, vomiting and depression. When emetine is given concurrently with Diodoquin [di-iodo-hydroxyquinoline] the cure rate is very high indeed, only some 2 per cent. of cases of amoebiasis proving refractory to cure by the combination.

Of the antibiotics which do not actually themselves destroy amoebae aureomycin and terramycin produce an amazing immediate response, but the relapse-rate after aureomycin is at least 14 per cent. Fumagillin is in another category as this antibiotic does not act on the bacteria as do the others, but it destroys the amoebae and some other protozoa. Of a preliminary series of 20 cases treated with it some 20 per cent. suffered parasitic relapse within 2 months, so the results were rather inferior to those obtained with aureomycin.

In the treatment of the patient the nature of his symptoms and location of his infection must be assessed. The symptomless carrier passing cysts, and suffering from only an intra-luminal infection, can suitably be treated with Diodoquin ; emetine is superfluous. When there is dysentery both a systemic amoebicide and a locally acting drug should be employed ; aureomycin or terramycin should be combined with chloroquine or emetine. In severe and fulminant infections antibiotics *must* be used or death may result.

The details of a number of suggested courses of treatment for different types of patients should be sought in the original. *A. R. D. Adams*

Scaffidi, V. & Sangiorgi, M. Inefficacia degli antibiotici nella terapia dell'epatite amebica. [**Failure of Antibiotics in the Treatment of Amoebic Hepatitis**] *Acta Med. Italica.* 1952, Nov., v. 7, No. 11, 281–91, 3 graphs. [39 refs.] English summary.

The authors' experience of the efficacy of antibiotics in amoebic hepatitis differs fundamentally from that of many who have spoken in high praise of them. After referring to many who have reported favourably on antibiotics in this condition, they give details of 11 cases under their own care. In some the treatment was begun quite early, from the 3rd day onwards, thus obviating any suggestion that antibiotic treatment had been started too late. There is no need to record each of these cases ; the antibiotics used were penicillin, aureomycin, chloramphenicol and streptomycin, in some a combination of two or more, but beyond temporary falls in temperature and improvement systemically the results were not satisfactory and resort was had to emetine and cure resulted in all but one. This was a man of 44 years (treated from the 15th day with chloramphenicol, but the hepatitis went on to abscess formation with lung complications) who died in spite of administration of aureomycin, 2 gm. daily, for 6 days. Chloramphenicol had previously been given for suspected typhoid infection (though the serum reactions were negative). The fever dropped and he remained apyretic for 15 days and improvement in general health continued for a couple of months, but in the 4th month from the beginning of his illness fever returned, with lumbar pain. He was operated upon and some 20 cc. of chocolate-coloured pus evacuated and aureomycin was given, 2 gm. daily by mouth. Temperature fell on the second day after and amoebae were no longer seen in the stools, but his condition remained grave. Another 150 cc. of pus were evacuated from the liver and after 6 days of the aureomycin, treatment with emetine and penicillin was started, but death took place on the following day. *H. Harold Scott*

YAWS AND OTHER TREPONEMATOSES

STEWART, T. D. & SPOEHR, A. **Evidence on the Paleopathology of Yaws.** *Bull. History of Med.* 1952, Nov.–Dec., v. 26, No. 6, 538–53, 7 figs.

This paper is based upon the study of the morbid anatomy of the changes present in a skull and pieces of 4 long bones. The bones were found during excavations about a *latte* village site on Tinian island in the Mariana group in 1950 by an expedition from the Chicago Natural History Museum. "A major objective of this expedition was to push forward the understanding of man's early history in that section of the Pacific called Micronesia, in which the Marianas lie." The *latte* are stone pillars, the foundation posts for houses of prehistoric inhabitants. The dead were buried on the seaward side of the house. The bones, with others, were found one foot beneath the surface of the ground. " It is likely that the Blue Site " (where the bones were found) " is prehistoric, although not very ancient ; probably it does not go back before 1200 A.D." A footnote adds that a tridacna shell associated with the house with which the bones were related gave a carbon-14 date of A.D. 854 ± 145. The Marianas were discovered by Magellan in 1521 and colonized by the Spaniards in 1668. They remained fairly isolated until taken over by the United States and Germany after the Spanish-American war [1898] when " the population was found to be heavily afflicted with yaws and possibly also syphilis ".

The bones described are considered to be of the same age at death as the skull, that was 13–14 years " judging by the developmental state of the still deeply embedded M 3's ". The frontal bone had two crateriform depressions up to 3 mm. below the surface (one was 28×18 mm.), with some evidence of inflammatory reaction in the surrounding bone. On the parietals were areas of destruction of the outer table and diploë producing a worm-eaten appearance ; one lesion was 8 mm. and the other 40 mm. in diameter. The edges were undermined. There was also a lesion on the left malar bone. The other bones (femur, humerus, radius and tibia) showed bony thickening and some expansion with localized cavitation. The cortex of the tibia was considerably thickened so that there was " the appearance of anterior bowing " ; some pits, apparently starting in the thickened cortex, were also present.

" The bone lesions here described, except the crater-like kind on the frontal, are indistinguishable from those seen in the bones of many adult American Indians from outside the tropics." The lesions are not seen in sub-adult American Indians from the same areas and " it is generally agreed that the disease . . . must have been syphilis. Logically, therefore, the disease in the present case should be yaws, both because of the geographical area from which the bones come and because of their youthful age." The lesions on the frontal bone were comparable with similar lesions on skulls of some Australian aborigines. The authors conclude that the significance of the Tinian specimen is " that it gives evidence not only of the presence, but of the character, of yaws in the Western Pacific before the introduction of syphilis ".

[This is an interesting paper although the pathological evidence for the diagnosis of yaws is not very satisfactory. However, similar lesions have been reported in bones of living Australian aborigines and of others who probably died before the arrival of Europeans in Australia (HACKETT, 1936, *Roy. Soc. Trop. Med. & Hyg.*, Monograph 1 ; see also this *Bulletin*, 1936, v. 33, 962). Similar bone lesions have been reported as occurring in the tertiary stage of yaws in Uganda within the past 15 years (see this *Bulletin*, 1952, v. 49, 741).

It may be of interest to call attention to a report by Captain Cook and Captain King, the explorers (COOK, J. & KING, J. A Voyage to the Pacific Ocean ;

Undertaken by Command of his Majesty, for making Discoveries in the Northern Hemisphere : Performed under the Direction of Captains Cook, Clerke, and Gore, In the Years 1776, 1777, 1778, 1779, and 1780. In Four Volumes. Vol. 1. p. 278. London : Printed for John Stockdale, Scatcherd and Whitaker, John Fielding, and John Hardy. 1784.), of their visit to Tongatabu in the Tonga or Friendly Islands in 1776, although these are over 3,000 miles from the Marianas. They wrote : " But they have another disease of a more mischievous consequence, which is also very frequent, and appears on every part of the body, in large, broad ulcers, discharging a thin, clear pus, some of which had a very virulent appearance, particularly on the face. Some, however, appear to be cured of it, and others mending ; but it was generally attended with the loss of the nose or a considerable part of it. It being certainly known, and even acknowledged by themselves, that the natives were subject to this disease before they were visited by the English, it cannot be the effect of venereal contagion, notwithstanding the similarity of the symptoms ; unless we adopt a supposition, that the venereal disorder was not introduced here by our people, in 1773. It certainly was amongst them at this time ; for, soon after we arrived there, some of our people received the infection."

Aoba, in the New Hebrides, was named by early explorers " Lepers Island ", but it has been said that the mutilations that earned it that name were more likely the result of yaws than of leprosy.

The reviewer would accept the lesions of the Tinian bones as being due to yaws, as he does those of the Australian bones to which he has referred.]

C. J. Hackett

Le Gac, P. Considérations sur le rôle du facteur hygrométrique dans l'étiologie du pian en Oubangui-Chari (A.E.F.). [**Observations on the Rôle of Humidity in the Aetiology of Yaws in Oubangui-Chari**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 6, 731–3.

Yaws is generally recognized as a tropical disease needing a warm climate, but that alone does not explain adequately its geographical distribution. Nor does altitude appear to be particularly important. Little attention has been paid to humidity except that humid zones such as forests have been noted among the causes of raised incidence.

The author's observations in Oubangui-Chari in French Equatorial Africa indicate that the existence and evolution of yaws appear to be entirely dependent on humidity.

Oubangui-Chari may be divided into two areas. The southern forested region between 3°–5°N has an average annual rainfall of 1·5–1·6 m. [58·5–62·4 in.], with a wet season from July to October and a dry season from December to February. The humidity ranges between 95 and 100 per cent. in the wet season and is then never below 65 per cent. ; in the dry season it may reach 20 per cent. The northern savanna area, between 5°–7°N, has an annual rainfall above 1·0 m. [39 in.] with an average of 1·25 m. [48·75 in.]. The vapour pressure of water varies considerably from above 26 millibars in the wet season to less than 10 in the dry season. The humidity follows these fluctuations and varies from 40 to 100 per cent., to fall sometimes to 15 per cent. in the dry season.

In the southern area the percentage incidence of yaws ranges from 7·3 to 14·75 among populations varying from 15,182 to 35,514 in 5 districts. In the northern area the incidence is under 0·5 per cent. of even larger populations in 5 districts.

The author concludes from his observations in Oubangui-Chari that it is possible to say that a minimal humidity is necessary for the existence of yaws, and that yaws is absent when this is not reached.

[More data relating to the peoples in the two areas, such as sanitary and educational status, dress, housing, occupation and prosperity, are required before one could be certain that humidity alone was the deciding factor. Similar studies from other yaws endemic areas would be interesting.]

C. J. Hackett

Levitan, S., Durand, J. B., Petrus, E. & Jacobs, J. C. Tratamiento del pian infeccioso con una inyección de penicilina. [**Treatment of Yaws by a Single Dose of Penicillin**] *Bol. Oficina Sanitaria Panamericana.* 1952, Dec., v. 33, No. 6, 565–81, 2 figs.

The authors carried out their experiment in Haiti to determine the effect, clinically and serologically, of a single dose of 600,000 units of penicillin with aluminium monostearate (PAM) injected intramuscularly into patients with infective yaws lesions. The district selected was Bainet because it was in a hilly region with a good water supply, so that there was no need for the inhabitants to go outside to get water, and there was little contact with neighbouring districts, though the region is readily accessible from Port-au-Prince ; also in this place the prevalence was high and the inhabitants anxious for treatment. Notices were sent out that treatment could be received on market days (Wednesdays and Saturdays). Patients were examined physically and the Kahn reactions performed. Whenever a case was discovered the whole family was treated so as to obviate reinfection from another member who might possibly be in the incubation stage of the disease.

Between 7th February and 27th October 1951, 636 persons received the treatment—intramuscular injection of 2 cc. (600,000 units) of PAM—and observations were kept up till 3rd January 1952, that is, for periods ranging between 69 and 321 days. Unfortunately, in the first 358 the blood level of penicillin was not satisfactory, owing possibly to some defect in preparation. From the 16th June, however, another preparation was used and between that date and August 221 patients received the treatment ; during September and October a small group of 57 were given half doses, 1 cc. (300,000 units). A series of tables present the results in much detail ; they may be summed up by saying that in primary yaws they were completely satisfactory, both clinically and serologically, and in the secondary stages 90·5 per cent. cleared up and nearly the same percentage (89·7) of those in what the authors call the "wet crab" stage. Thus, though not completely curing all patients, the single dose of 600,000 units is, in the authors' opinion, adequate for "mass treatment".

H. Harold Scott

Le Gac, P. Un cas de pian rebelle au bismuth, au mercure et à la pénicilline, ayant guéri à la suite d'un traitement à l'huile de chaulmoogra. [**A Case of Yaws Resistant to Bismuth, Mercury and Penicillin Responding to Treatment with Chaulmoogra Oil**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 6, 733–4.

Varela, G., González Rivera, M. & Barriga Vázquez, F. Algunos datos epidemiológicos y estadísticos del mal del pinto. Tabulación de 460 historias clínicas. [**Some Epidemiological and Statistical Data of Mal del Pinto, based on 460 Clinical Cases**] *Bol. Oficina Sanitaria Panamericana.* 1953, Jan., v. 34, No. 1, 19–22.

In Arcelia and among the inhabitants round about, in Guerrero State, the authors have studied a large number of patients suffering from mal del pinto and in the present paper analyse 460 of them. Of the total, 207 (45 per cent.) were males, 253 (55 per cent.) were females ; sex, therefore, probably plays no part in the incidence ; 20 were whites, 440 were coloured (*morenos*) [but as

the relative populations are not stated this does not necessarily imply greater susceptibility of the latter]. Persons of all ages are affected, though those under 10 years of age are not often attacked ; the men are mostly agricultural workers, the women are engaged at home. More than half (257) live in bad hygienic surroundings ; another 184 (40 per cent.) in fair conditions and only 19 (4·1) in good. Malnutrition or innutrition does not seem to play any part, for 91·3 per cent. were well nourished ; in 425 instances (92·4 per cent.) domestic animals lived in close contact with the patients ; only 37 (8·1) had baths regularly, 401 (87·1) used river water for all purposes and only 59 (12·9) had their own wells. Only 2 houses had a latrine, 458 (99·5) had no proper conservancy system and defaecated in the open ; bugs, lice and fleas are numerous in the dwellings. Briefly, the general living conditions are bad and the obvious measures to take first are to provide improved sanitation and to educate the people to a greater sense of cleanliness. *H. Harold Scott*

LEPROSY

Mac Arthur, W. **Mediaeval " Leprosy " in the British Isles.** *Leprosy Review.* 1953, Jan., v. 24, No. 1, 8–19.

This fascinating study should be read in the original by all interested either in history or in leprosy. The contention is " that no assertion of leprosy in old times can be accepted as indicating an infection with Hansen's bacillus in the absence of clinical details sufficient to point the diagnosis ", and " there might have been a leper in a village here and there, one or two in a market town, a dozen or more in a city, a score or so in a whole diocese ".

First the word leper is examined. The basic meaning is " something that peels off ", and hence it was applied to scaly skin diseases in general. The Latin form of the word *liber* came to mean a book, as the inner bark of trees was peeled off and used for books. Thus library and leprosy are in origin the same word. The word lepra was applied to any condition with scabbiness. The plural leprosies was often used, and included such various conditions as bubonic plague, smallpox, weakness and infirmity. Thus the Hebrew word *naga* in Isaiah, chapter LIII, translated " stricken " in the Authorized Version of the Bible, was given as *leprosus* in the Vulgate and as leprous in Wyclif's translation a thousand years later. Thus in the 12th century many persons believed that Christ had gone to His death as a leper, " so that noble ladies in a kind of religious fervour would wash the feet of lepers and embrace their diseased bodies ". As a result many leper houses were founded up and down the country. The number of such houses in England has been put as high as 283, but there is no evidence that more than a few of the inmates were actually suffering from infection with Hansen's bacillus. Records about such places were often due to mistranslations. Thus the name " the Leper Hospitals of Armagh " was found on investigation by the author to be due to a mistaken translation of " oratories " into a term meaning " hospitals ", and at a later date the latter term was again mistranslated into another meaning " leper houses ".

The tradition that Robert the Bruce had leprosy seems to have been founded on his disappearance from court for a time during 1327, but the true cause of his disappearance was an attempt to arrange secretly for the invasion of Ireland ; and 3 weeks before his death he was still conducting State business in public. Bruce had been repeatedly excommunicated by the Church ; " what a triumph it would have been to point at one who ' showed such contempt for the Keys of Holy Mother Church ' smitten with leprosy by the hand of God ! ".

The author believes that leprosy diminished during the 14th and 15th centuries chiefly because of the rising standard of living ; but the apparent diminution may also be partly the result of more accurate tests of diagnosis being imposed, so that other diseases were excluded.

The study closes with the following : " Those persons who choose to adhere to the literalist interpretation of words like ' leper ' and ' leprosy ' in old usage, ought to be consistent in their practice. They should maintain, therefore, that the Black Death was leprosy because Gilbert le Baker called it ' lepra ' ; that the Old Testament prophecy (Isaiah LIII) foretold that the Christ would be afflicted with leprosy because He was called ' leprosus ' ; and that the leperous distilment that Hamlet's uncle poured into the king of Denmark's ear was in reality an infusion of *Mycobacterium leprae* ". *Ernest Muir*

SCHNEIDER, K. Das Vorkommen von Lepra im Kreise Memel und das deutsche Lepraheim bei Memel 1899 bis 1945. [**Leprosy in the Memel District and the Memel Leprosarium between 1899 and 1945**] *Öffentl. Gesundheitsdienst.* Stuttgart. 1953, Mar., v. 14, No. 12, 465–9.

Leprosy, it was thought, had disappeared from Europe at the end of the 17th century, but in the middle of the 19th, foci of the disease were noted in Norway, Spain, Portugal, Sweden, Russia and the Balkans. In 1884 a Memel physician saw a case and in 1893 Dr. Pindikowski, a Memel practitioner, reported 9 living patients and said that 4 had died in the district in recent years. The first case known in Memel was in a Lithuanian peasant in 1848 and the last in 1934, a man who had become infected in Memel 12 years earlier. Between 1848 and September 1944, there had been 94 known cases in the Memel district, 42 males, 52 females. Of these, 3 were alive, 2 males and 1 female, in the leprosarium in 1944. In 1943, four men and one woman suffering from leprosy had been removed to the leprosarium, the men from Hamburg-Eppendorf, the woman from Magdeburg. Establishing a leprosarium had been proposed in 1898–99 and one was opened on 20th July, 1899, for 16 patients, enlarged for 22 ten years later. Since the opening in 1899 there have been 85 patients, 45 from the Memel district, 18 from Lithuania, 2 from Letland and Esthonia, 11 from South America, 4 from the Netherlands Indies, 1 from Poland (this patient may have acquired the infection in S. America), 1 from Constantinople and 1 each from the West Indies and the Far East [these total 84]. Forty-three were females, 42 were males ; 56 were of the nodular form, 21 the anaesthetic and 8 mixed. In 1944 there were 11 patients in the leprosarium, 8 males, 3 females. Two nursing-sisters were in attendance, of whom one had been there for nearly 40 years, the other for 17 years, but neither had become infected.

All the newest forms of treatment are undertaken, but until some certain and rapid method of cure is known, strict isolation is advocated and all those in an active state, excreting the bacilli, are brought to the leprosarium. Psychic disturbances are common and difficult to treat or deal with, such as insomnia and nightmares, paranoia, delusions of poisoning, sense of helplessness, general depression and anxiety. In 1944 the inmates passed through a bad time owing to the war and by 1945 ten of the 11 had died, 5 from dysentery and typhoid and only one was still alive. *H. Harold Scott*

MELSOM, R. S. **Three New Cases of Leprosy in Norway.** *Leprosy Review.* 1953, Jan., v. 24, No. 1, 27–33, 2 charts.

Leprosy increased in Norway as it did in Western Europe at the time of the Crusades. It diminished in Western Europe and in Norway in the 16th and

17th centuries, but in contrast to the former it increased again in Norway in the 18th and 19th centuries. In the quinquennium 1865–69 1,040 new cases were found, but the number of new cases gradually diminished till in 1900–05 only 89 were found, and in 1940–45 none at all. Since 1930 there have been 9 cases traced to an old infection inside Norway, and there have also during that period been 3 cases due to infection outside the country.

The 3 cases described were siblings, 2 men and a woman, the offspring of a mother with advanced lepromatous leprosy. This woman's 4 other children, though likewise exposed to infection, are healthy. These cases are described to show that leprosy can still crop up in Norway, and it is important that medical officers of health with archives giving information about families in which leprosy formerly occurred should keep this possibility in mind.

Ernest Muir

CARLOS GYORKO, A. La lepra en el Archipiélago Canario. (Datos históricos y su distribución geográfica.) [**Leprosy in the Canary Islands**] *Bol. Soc. Cubana de Dermat. y Sifil.* 1952, June–Sept.–Dec., v. 9, Nos. 2, 3 & 4, 49–54.

Examination of the bones of the prehistoric (Guanche) population fails to show any sign of leprosy. The Canaries were visited in succession by the Greeks, Romans, Phoenicians and others, and after 1016 A.D. by the Arabs. At the end of the 13th century a Genoese adventurer founded a fort, and from then on the islands were visited by Spanish, Portuguese, and other peoples. It can be stated that leprosy was not imported during the conquest by Spain (1483–1496) but from ancient times, and that there were foci of leprosy among the Arabs, Greeks and Romans, and it may be supposed that slaves brought to the Canaries in connexion with the repeated expeditions were carriers of leprosy. The population of the archipelago is 766,862. The calculated number of sufferers from leprosy has varied from time to time over a wide range from 175 in 1788 to 82 in 1914, to 68 in 1928, and again to more than 650 after a special survey in 1945. At present there are 78 patients in leprosaria, but it is calculated that there are about 1,177 cases in the whole of the islands, a rate of 1·86 per thousand. The author, who has spent 15 years of uninterrupted anti-leprosy work in the islands, asserts : We are able to affirm that the best way to fight against the extension of leprosy is to improve the elementary hygienic conditions of life in certain leprosy-spreading zones . . . and we must also employ all the measures available from adequate treatment, early diagnosis, etc. till the standard of living has been raised in certain classes of the population. *Ernest Muir*

COCHRANE, R. G. **Report on Visit to Nigeria 15th March to 1st May, 1952.** *Leprosy Review.* 1953, Jan., v. 24, No. 1, 33–51, 8 figs.

From its nature this Report is difficult to summarize, being full of descriptions of places and personalities. The most striking observation is the cooperation of Government, Missions and the British Empire Leprosy Relief Association.

The work in Eastern Nigeria is most fully described : the leprosaria, the outpatient clinics and segregation centres. The latter have met with signal success, particularly in the Uzuakoli area. Especially through the Research Unit in Uzuakoli the use of DDS has been extended throughout the country with very promising results. At this Unit trials of the use of BCG for the possible production of immunity are being made. In the Northern Provinces the work is much less developed. The backwardness of education and the indifference of the people make segregation difficult. Here the 3 main requirements are : rural segregation units, full-time doctors and segregation of children from infective patients.

While Nigeria is now, under the new Constitution, divided into Eastern, Western and Northern Regions, there is one Leprosy Service for the whole country. " While this makes the task of the Centre much more difficult in one way, nevertheless it does ensure (and this is important as far as leprosy is concerned) that general principles, laid down by the Headquarters of the Leprosy Service, are modified according to local conditions."

Ernest Muir

NUÑEZ ANDRADE, R. La lepra en México. [**Leprosy in Mexico**] *Medicina.* Mexico. 1953, Jan. 10, v. 33, No. 667, 12–18, 1 map. [14 refs.]

Mexico has a population of about 26½ millions, of whom about 3⅓ millions live in Mexico City, situated some 6,700 ft. above sea level.

Leprosy was first introduced into Mexico in the 16th century by the Spanish conquerors, then by Negro slaves from Africa and the Antilles, and later through the Pacific coast by travellers from the Philippines, Japan and China. The greatest contribution made by Mexico to the knowledge of leprosy was that made by Rafael Lucio and I. Alvarado in 1852 : *Opúsoulo sobre el Mal de San Lázaro o Elefanciasis de los Griegos.*

A federal law was promulgated in 1930 for the prophylaxis of leprosy. The official number of people suffering from leprosy in the end of 1951 was 10,637, but it is believed that there are actually more than 50,000, though a thorough survey has not yet been made in many regions. The *Campaña contra la Lepra en México* has 1 leprosarium, 4 special centres, and 19 dermatological centres, for the treatment of leprosy. There are 3 *Preventorios* for the healthy children of leprous parents. *Ernest Muir*

SCHUJMAN, S. Estudio evolutivo del estado inmunologico en los casos lepromatosos beneficiados con diversos medicamentos antileprosos (chaulmoogra y sulfonas). [**A Study of the Evolution of Immunity in Lepromatous Patients who have Benefited from Various Forms of Anti-Leprosy Treatment (Chaulmoogra and Sulphones)**] *Bol. Soc. Cubana de Dermat. y Sifil.* 1952, June–Sept.–Dec., v. 9, Nos. 2, 3 & 4, 43–8, 4 figs. English summary.

The study included 150 originally Mitsuda-negative lepromatous patients, of whom 100 were treated with chaulmoogra and 50 with sulphones. Of the total, 20 became bacteriologically negative ; 50 improved bacteriologically and clinically ; and 80 improved clinically only. Of the 20 who became negative 12 had been treated with chaulmoogra and 8 with sulphones. In none of the 150 did the early (Fernandez) lepromin reaction become modified ; in 5 out of the 20 who became bacteriologically negative the late Mitsuda reading became positive ; out of the 5 with the altered reaction 4 had been on chaulmoogra and 1 on sulphones. In 2 of the 4 chaulmoogra-treated cases the reaction was strong (5 to 6 mm.) ; and in the other 2 it was weak (3 mm.). In the sulphone-treated case it was weak (4 mm.). The 2 chaulmoogra-treated cases with the strongly positive results had remained bacteriologically negative for 4 and 5 years since their treatment had terminated. *Ernest Muir*

GANDHI MEMORIAL LEPROSY FOUNDATION, WARDHA [WARDEKAR, R. V., Secretary]. **Memorandum on the Leprosy Work of the Gandhi Smarak Nidhi.** 1952, 11 pp. [Memo. No. 1.]

——. **Memorandum on the Our " Leprosy Control Scheme " and the Details regarding its working.** 1952, 19 pp., 1 map & 1 plan. [Memo. No. 2.]

These two Memoranda describe the new scheme for leprosy control in India under the Gandhi Memorial Leprosy Foundation. The first Memorandum

gives the general principles of the scheme, and the second goes into more detail. In the first place 9 different methods of anti-leprosy activity are shortly described : leprosy colonies, clinics, homes for children of leprous parents, homes for beggars with leprosy, research, propaganda, statistics, personnel and training, and rehabilitation. From among these, clinics, propaganda, statistics and training of personnel are selected as being within the limited means of the Foundation. The others are discarded, not for want of belief in their usefulness, but because with the resources now available more hopeful results are likely to be achieved by this selection.

The scheme is a dual one, aiming at establishing 15 " Control Units " scattered over the larger Provinces, and 17 " Control Clinics " scattered over the smaller areas. Each Control Unit will work on a group of about 35 to 40 villages for a period of 5 to 10 years. It will have a staff of a doctor, a leprosy organizer, an assistant and a peon. It will work from 3 clinics, so placed that no patient has to travel more than a few miles to attend. The expenditure for 5 years is calculated at Rs. 1·2 lacs (about £9,000) for each Control Unit, including capital and recurring expenditure. The Control Clinic works on similar principles, except that its area contains only 10 to 15 villages, there is only a part-time doctor, and the only full-time workers are the Leprosy Social Worker and the peon.

Patients have to attend one of the clinics once a week for examination, and for treatment, which consists of DDS tablets along with other remedies for complications. But for those in whom the treatment has become standardized after a suitable period, the treatment may be partly decentralized and the patient needs to attend only once a month during the busy season, supplies of tablets being administered through Voluntary Village Social Workers. Much other help is also expected from these voluntary workers in their own villages.

Meanwhile a thorough survey is gradually worked out, largely through the efforts of the Leprosy Organizer, who will prepare lists of suspected patients and contacts for the use of the doctor. In at least 10 villages there will be an examination of all children below 15 years of age. Simple but adequate statistical methods have been worked out, so that it will be possible to know after 5 years if there has been a fall in the number of infective cases and of newly infected cases.

Great stress is put on training of workers, courses for doctors, organizers and social workers being held, and State Governments and local bodies being asked to see that all medical students have a thoroughly practical training in leprosy.

The whole scheme is a thoroughly practical one, suited to a poor village community. Its chance of success is largely based on the effective, cheap and easily-administered treatment now available in DDS tablets. If suitable personnel can be secured it should work smoothly and with a fair chance of favourable results. *Ernest Muir*

DE SOUZA-ARAUJO, H. C., with the collaboration of Rita A. de A. CARDOSO. Sensibilidade da *Macaca mulatta* ao bacilo de Stefansky, amostra do Instituto Pasteur de Paris, e estudo anátomo-patológico das lesões produzidas. [**Susceptibility of *Macaca mulatta* to Stefansky's Bacillus : Anatomo-Pathological Study of the Lesions**] *Mem. Inst. Oswaldo Cruz.* 1952, Mar., v. 50, 691–701, 9 figs. on 2 pls.

BARNETT, Margaret & BUSHBY, S. R. M. **The Activity of Iso-Nicotinic Acid Hydrazide in Murine Leprosy.** *Leprosy Review.* 1953, Jan., v. 24, No. 1, 19–26, 1 chart. [18 refs.]

Groups of 10 mice each, which had been inoculated intravenously with dilute suspensions of *Myco. leprae-murium*, were treated from the time of inoculation

onwards with one of the following drugs : isoniazid, streptomycin, TB1/698 [a thiosemicarbazone], sulphetrone, and DDS. A sixth group was used as a control. The streptomycin was given subcutaneously, and the others were given mixed with the diet. The doses were the maximum amounts that previous experiments had shown to be tolerated by mice. Isoniazid almost completely inhibited the multiplication of *Myco. leprae-murium* ; somewhat less activity was shown by streptomycin and TB1/698 ; the sulphones showed only very doubtful activity.

Because of the varying results obtained with isoniazid in the treatment of human leprosy, and particularly because of the unfavourable results obtained by Lowe [this *Bulletin*, 1953, v. 50, 127] the authors conclude in spite of their results with rats : that the antileprotic value of isoniazid in the human disease is therefore still in doubt, but it is only a question of time before the answer will be known for, unlike streptomycin or TB1/698, isoniazid is inexpensive, relatively non-toxic, and easily administered. *Ernest Muir*

Chaussinand, R., Viette, M. & Krug, O. Action de l'hydrazide de l'acide isonicotinique sur le rat infecté par le bacille de Stefansky. [**Action of Isoniazid on Rats Infected with Stefansky's Bacillus**] *Ann. Inst. Pasteur.* 1953, Feb., v. 84, No. 2, 431–4.

The treatment of rat leprosy is notoriously ineffective. The authors tried various substances with little success and eventually treated 30 infected rats with isoniazid, leaving 15 as controls. The rats had been infected with suspensions of Stefansky's bacillus prepared from lesions in rats infected 5 months previously. Three different strengths of suspensions were given, namely those containing large, moderate and low numbers of organisms.

The animals were given 0·75 mgm. to 1·0 mgm. of isoniazid daily, which was well supported : the treatment was started 1 to 17 days after inoculation. After 7 months, all the controls showed inoculation lesions, proportionate to the size of the inoculum, and massive lymphatic dissemination. None of the treated rats showed any clinical lesions, and histological changes were limited to minimal inoculation lesions and slight changes in the neighbouring lymph glands, which contained very few organisms.

In 3 treated animals and 3 controls the Middlebrook-Dubos reaction was done : in the controls, it was positive at titres of 1 /2 to 1 /8 and in the treated animals it was negative.

The authors note that hitherto no antibiotic or chemical agent has been known to prevent clinical lesions and lymphatic spread of the organisms in animals infected with Stefansky's bacillus. *H. J. O'D. Burke-Gaffney*

Viette, M. Réaction de Middlebrook-Dubos chez le rat infecté par le bacille de Stefansky, avec un antigène extrait du bacille de Koch. (Note préliminaire.) [**The Middlebrook-Dubos Reaction in Rats Infected by Stefansky's Bacillus, carried out with an Antigen Extracted from** *Myco. tuberculosis*] *Ann. Inst. Pasteur.* 1953, Feb., v. 84, No. 2, 434–6.

The following is a translation of the author's summary :—

The haemagglutination reaction, carried out with the polysaccharide antigen extracted from *Myco. tuberculosis*, showed the presence of antibodies in 15 out of 18 rats inoculated subcutaneously with different suspensions of Stefansky's bacillus from 2 to 6½ months previously, while the reaction was negative in 10 uninfected rats and in 3 infected rats treated with isoniazid.

The fact that rats infected with Stefansky's bacillus showed antibodies reacting with an antigen extracted from *Myco. tuberculosis* is a new argument in favour of their relationship. The maximum titre of 1/16 is, however, weak compared with that obtained by different authors and ourselves with serum from human cases of tuberculosis or leprosy. It cannot be stated at the moment if the low titre is due to some difference in antigen constitution between Stefansky's bacillus and *Myco. tuberculosis* or more to the incapacity of the rat to develop a high level of antibodies. *H. J. O'D. Burke-Gaffney*

GOULDING, R., ROBSON, J. M. & REES, R. J. W. **Intracorneal Murine Leprosy and its Response to Isoniazid.** *Lancet.* 1953, Feb. 28, 423–4.

Forty mice were inoculated intracorneally with a suspension of rat leprosy bacilli, by means of a method formerly described by two of the authors as used with tubercle bacilli [*Bull. Hyg.*, 1950, v. 25, 790]. The mice were divided into 4 groups, 1 of which was used as a control, while to the other 3 were given, with their food, thiosemicarbazone, sulphetrone, and isoniazid respectively. There was practically no difference in the development of lesions between the first 3 groups, the lesions advancing clinically and showing histologically large cells full of bacilli and extracellular bacilli. But in the isoniazid group the lesions retrogressed till only corneal opacities remained ; while histologically there were no extracellular bacilli and intracellularly only ill-defined acid-fast material and granules. The authors acknowledge that this does not necessarily mean that isoniazid should be of value in human leprosy. *Ernest Muir*

CRUICKSHANK, J. C. **A Trial of Isoniazid in Rat Leprosy.** *Lancet.* 1953, Mar. 28, 624–5.

The author injected 40 rats intraperitoneally with material from a rat which had been infected two months previously with the rat leprosy bacillus : the suspensions used showed about 20 mycobacteria per field in stained films. The rats were treated with isoniazid ("Pycazide") in a daily dose of 20 mgm./kgm. in 3 groups of 10 animals each, namely those treated (*a*) for 4 weeks from the day of infection, (*b*) for 20 weeks from the day of infection, (*c*) for 4 weeks, starting 4 weeks after infection. Ten untreated rats constituted a control group.

All the rats which died were examined and microscopic preparations made from any lesions present. The results are shown in a table, which shows that in groups (*a*) and (*c*) intercurrent disease appeared, in the form of large abdominal abscesses : only rarely was an acid-fast bacillus seen in some of these, but the author suggests that it is possible that these lesions are not entirely independent of rat leprosy. The animals dying of typical rat leprosy had extensive lesions containing very large numbers of acid-fast bacilli. All the control animals were thus affected and in 46 weeks since infection all have died. Only 2 treated rats (both in group [*a*]) showed typical signs of rat leprosy : they were among 20 rats which had had some treatment and survived to the 25th week. All those animals which had received isoniazid for 20 weeks, however, are still alive and well. It is clear that a prolonged course of treatment had a beneficial effect on the disease and that shorter courses may be effective. Observations on surviving rats, including a watch for drug resistance, will be reported later. The work by the authors shown above [BARNETT & BUSHBY ; CHAUSSINAND *et al.*; GOULDING *et al.*] is briefly discussed. *H. J. O'D. Burke-Gaffney*

HELMINTHIASIS

STRYJECKA-USTUPSKA, Anna. **A Helminthologic Survey of Railway Employees of the Warsaw Railway Circuit.** *Texas Reports on Biol. & Med.* 1952, v. 10, No. 4, 929–30.

Between 1945 and 1951, in the Warsaw Railway Sanitary Services laboratories, 5,019 specimens of faeces were examined for helminthic ova, 47 per cent. from men and 53 per cent. from women. Positive results were obtained in 22·25 per cent. and were about equal in the sexes.

Some observations are made on the findings in terms of sex and age distribution and seasonal prevalence. The greatest incidence of helminthic eggs in faeces was in the spring (mostly in March), with a fall in October.

An additional series of 819 persons was examined in 1951 : of these, 59 were from rural areas and in them helminthic ova were found in only 3 cases. Of the total of 819, positive results were found in 13·78 per cent.

The principal positive findings were for *Trichuris* (11·2 per cent.), *Ascaris* (5·8), *T. solium* (4·4), *Diphyllobothrium* (0·20) and *Enterobius* (1·3 per cent.). *T. saginata* was found in only 0·2 per cent., but the use of beef is limited as compared with pork. The finding of *Diphyllobothrium* in only 7 cases points to its rarity in that part of Poland, and the comparative rarity of *Enterobius* is also claimed [but the examination was confined to faeces].

The prevalence of helminths in Poland as assessed by this survey is stated to be lower than was found by other Polish investigators before and since the last war [but no references are given]. This is attributed to better understanding of hygiene and sanitary measures by individual members of the population.

H. J. O'D. Burke-Gaffney

See also p. 512, NEGHME, SILVA & ALVAREZ, Encuesta enteroparasitaria en el extremo austral de Chile. [**Survey of Intestinal Parasites in the Southernmost Area of Chile**]

RITCHIE, L. S., HUNTER, G. W., PAN, C., YOKOGAWA, M. & SZEWCZAK, J. T. **Parasitological Studies in the Far East. VI. An Epidemiologic Survey on Kyushu Island, Japan.** *Japanese J. Med. Sci. & Biol.* 1952, Oct., v. 5, No. 5, 299–310. [15 refs.]

"An epidemiologic survey of intestinal and blood parasites was made on Kyushu, southernmost island of Japan, including areas of Saga, Fukuoka, Kumamoto, Kagoshima and Oita prefectures. Intestinal parasites occurred in 94·2% of 2073 persons ; 92·6% harbored helminths and 33·2% had protozoa. Specific helminths included : *A. lumbricoides* 74·6%, *T. trichiura* 30·4%, hookworm 50·2%, *Trichostrongylus* sp. 3·2%, *E. vermicularis* (by scotch tape swab) 25·7%, *M. yokogawai* 4·9% and *C. sinensis* 3·3%.

" The incidence of specific protozoa was *E. histolytica* 5·3%, *E. coli* 19·9%, *E. nana* 12·1%, *I. bütschlii* 1·7%, *G. lamblia* 6·0% and *C. mesnili* 1·3%, *E. histolytica* ranged from 0·5% at Nagatoishi to 14·8% at Kagoshima City.

" In the endemic area of Saga and Fukuoka prefectures 47·1% of those examined were positive for *Schistosoma japonicum*. In Nagatoishi (Kurume) 72·9% were positive.

" Microfilariae of *W. bancrofti* were recovered from 19·4% of the people in a village near Kagoshima City, at the southern end of Kyushu."

[See also this *Bulletin*, 1952, v. 49, 1050.]

RIBEIRO, V. de M. Método de alta concentração para pesquisa de ovos de vermes e cistos de protozoários intestinais. [**High Degree of Concentration (of Faeces) in Search for Helminth Ova and Cysts of Intestinal Protozoa**] *Med. Cirurgia Farmacia.* Rio de Janeiro. 1952, Sept., No. 197, 430–31.

The results of the author's method are compared with those of the Faust method using the same sample of faeces. The author's procedure is as follows : with a glass rod a portion of the stool is placed in a tube with 10 cc. of distilled water and triturated to a uniform suspension. This is then divided in two centrifuge tubes and spun at 2,500 r.p.m. for 10 minutes. After decanting the supernatant fluid he repeats the process—distilled water added, emulsification with the glass rod and re-centrifuging as before. After again decanting he adds 10 cc. of 33 per cent. solution of zinc sulphate and centrifuges and after a pause of 10 minutes centrifuges again at low speed for another 2 minutes. The contents of one tube are examined by Faust's method, withdrawing 10 platinum loopfuls from the upper layers, mixing with a drop of Lugol's solution and examining with low magnification. The contents of the other tube are " partly decanted " to obtain only the superficial layer of the sulphate solution containing any ova and cysts which may be present. Twenty cc. of distilled water are then added and the whole is centrifuged afresh at 2,500 r.p.m. for 10 minutes, so obtaining all the ova and cysts present in the portion of faeces used. [The description does not make clear what is done with the superficial layer removed.] After decantation a drop of Lugol's solution is added, and the whole is well shaken to loosen the heavier ova from the bottom of the tube and examined in the same way as the other specimen.

Two tables set out the findings in 14 cases, comparing the results in the two methods, and judged by these the author's modification would seem to be much superior. For example, in one patient's sample 2 ova of *Taenia* were seen by Faust's method (A), 59 by the author's (B) ; in another, 15 *Ascaris* ova by A, 327 by B ; in a third, 36 hookworm ova, 2 *Ascaris* ova and 1 *Trichuris* by A, but 201, 113 and 19 respectively by B ; in a fourth, 25 ova of hookworms, 19 of *Ascaris*, none of *Trichuris* or *Strongyloides* larvae in A, but 111, 486, 11 and 23 respectively in B ; 119 *E. coli* cysts in A, 584 in B. There are others, but those quoted are the most important and will suffice to indicate the difference in results by the two methods. *H. Harold Scott*

DA FRANÇA, O. H. Alergia nas helmintíases. [**Allergy in Helminthic Diseases**] *Hospital.* Rio de Janeiro. 1952, July, v. 42, No. 1, 51–5. English summary.

In 150 patients suffering from allergic conditions, the author found that 47 (31·33 per cent.) were harbouring worms, commonly single species. The commonest worms found were *Trichuris* (46·8 per cent.) and *Ascaris* (40·42) : the least common were *Hymenolepis* and *Taenia*, which were found only once each. In 11 patients, intestinal protozoa were also present. The skin was the tissue most frequently showing manifestations of allergy : of the 47 cases, dermatitis was present in 21 and urticaria with oedema in 12. Faecal examinations are necessary to establish the influence of the parasites, as positive skin tests are not necessarily evidence of their presence.

The author was unable to show any relationship between the kind of parasite, the degree of infection, the nature of the lesion or its intensity.

The best treatment was found to be expulsion of the parasite. In 8 cases of skin diseases cure followed anthelminthic treatment alone and the author considers that in these cases the worms were the sole cause of the allergy.

H. J. O'D. Burke-Gaffney

GAUD. J. Revue critique des travaux consacrés à la bilharziose vésicale au Maroc. [**Critical Study of Work Relating to Urinary Schistosomiasis in Morocco**] *Bull. Inst. Hyg. Maroc.* 1951, v. 11, Nos. 1/2, 69–95, 4 figs. [55 refs.]

The author presents and discusses critically the data available in published works and reports on schistosomiasis in Morocco, with much of which readers of this *Bulletin* will be familiar. The subject is dealt with under the following headings : geographical distribution, incidence of the disease, clinical importance, epidemiology, ethnology, molluscan vectors, risk of spread and prevention. It is an interesting and complete account and the commentary is well-informed and well-balanced.

The author's conclusion in French is translated freely as follows : Apart from its geographical distribution, schistosomiasis in Morocco is not well known. Information as to what preventive measures should be adopted is particularly lacking. There is no doubt that the problem is not of major public health importance in Morocco and the disease is far from being the scourge that it represents in Egypt or elsewhere in Africa. However, in view of the lack of information concerning it the problem is worthy of further study and in the present review we can only indicate the lines of investigation which should be followed up.

J. J. C. Buckley

PARENT, M. & VERBRUGGEN, J. Contribution à l'étude du problème de la bilharziose au Katanga. [**Study of Schistosomiasis at Katanga**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 255–68, 1 map.

Data obtained from the annual reports of the Medical Department of the Union Minière du Haut Katanga concerning morbidity and mortality in schistosomiasis during the period 1930–1950 are presented, and these show that during the 21 years 1·3 per 100 per annum suffered from the disease and 1·5 cases per 1000 were fatal. On an average the annual mortality was 2 per 100,000.

The authors' researches were carried out in the dry season (August-October) of 1951 when they visited two rural villages near Jadotville, namely Buluo and Kaponona, whose respective populations are 1113 and 444. Snails were collected (*Planorbis adowensis, Physopsis africana, Lymnaea natalensis*) from various localities and 9860 were examined for schistosome infection. This number comprised 6150 *Planorbis*, 3589 *Physopsis* and 121 *Lymnaea*, of which 34·9 per cent., 12·2 per cent. and 0 per cent. respectively were found to be infected.

Faeces and urine specimens of 1208 people were examined (840 in Buluo and 368 in Kaponona) and of these 42·46 per cent. were found positive for intestinal and 59·85 for vesicular schistosomiasis. The faecal specimens were examined direct without concentration and the urines were centrifuged. The faecal examinations also revealed relatively small percentages of infection with hookworm, *Strongyloides*, and *Enterobius*. Positive findings in faeces and urine occurred simultaneously in 26·82 per cent. of the 1208 examined. Eggs of the *S. mansoni* type were found 19 times in urine and terminal-spined eggs were found 13 times in faeces. Clinical examinations gave the following results : in 260 persons (21·5 per cent.) symptoms were present, of which 133 were diagnosed by examination and 127 by interrogation.

In discussing the results the authors comment on the high incidence of schistosomiasis especially with *S. mansoni* (42·46 per cent.) which was diagnosed only by direct examination of faeces, and it is thought that this figure should in reality be 100 per cent. Nevertheless the low symptom rate calls for caution in considering control measures based on the treatment of all infected persons,

which may be unnecessary and even dangerous for some of the patients. In their opinion the problem calls for general preventive measures such as gradual education of the masses and improvement of standards of living, in other words, urbanization and social development. *J. J. C. Buckley*

GREANY, W. H. **Schistosomiasis in the Gezira Irrigated Area of the Anglo-Egyptian Sudan. II.—Clinical Study of Schistosomiasis mansoni.** *Ann. Trop. Med. & Parasit.* 1952, Dec., v. 46, No. 4, 298–310. [17 refs.]

Over a period of three years 410 in-patients harbouring *Schistosoma mansoni* were under the author's care in a hospital in the Sudan. All had been infected for some time. The ratio of males to females was 10 : 1 ; this was largely owing to the reluctance of the women to enter hospital. Many of the patients were found only by chance to be infected. In those with clinical manifestations of the disease a dysenteric diarrhoea with abdominal discomfort, anorexia, and lack of energy were the usual complaints. In the severely affected, particularly children, enlargement of the liver, and usually of the spleen as well, were marked and obvious. No cases of lung, cardiac, or nervous involvement due to schistosomiasis were observed. In a table are set out the major clinical features of the cases.

The methods used for the diagnosis of this form of schistosomiasis in the area were the examination of direct smears of stool for ova, a sedimentation of stool emulsified in water, sigmoidoscopy and rectal biopsy, and the performance of skin sensitization tests with antigens prepared either from cercariae or from adult worms. These skin tests were found to be unreliable either for hospital examinations or for village surveys and they proved much inferior to stool examinations in diagnosis.

Three forms of treatment were employed for the hospital patients and for others found to be infected at village surveys. These were (*a*) intensive short courses of antimony preparations ; (*b*) long courses of tartar emetic and (*c*) Miracil D treatment. Intensive short courses of sodium antimony tartrate were given to 32 patients, some of whom were symptomless ; in most cases there were severe symptoms of toxicity, and after one patient's death as a result of these the treatment was abandoned. In any event the parasitic cure-rate following the concentrated antimony treatment [presumably of *S. mansoni* infections] was unsatisfactory. Intensive courses of fouadin or of pentostam were also given but these proved quite ineffective in eradicating the parasitic infection.

The usual protracted course of treatment with potassium antimony tartrate was also used ; when intravenous injections could not be given, as in the case of young children, fouadin treatment was given [presumably intramuscularly]. Though toxic side-effects were usual they were not unduly severe, apart from a fatality in the case of a girl of 16 immediately following the injection of 2 grains of tartrate ; subsequently the maximum dose of the drug was limited to 1·5 grains. The rate of cure following the treatment of some 651 patients appears to have been about 75 per cent. of cases, but many of those treated suffered from *S. haematobium* infections [and apparently not from *S. mansoni* infections].

Miracil D was given in the form of uncoated tablets. Vomiting was a troublesome side-effect. Of 10 cases of *S. mansoni* infection so treated only 2 seemed to have been cured of it.

The prognosis of *S. haematobium* schistosomiasis in the area is good, but that of *S. mansoni* is much less so. Liver enlargement, in this area, is usually due to *S. mansoni* infection and but rarely to other causes. The cirrhotic changes in the liver may be due either to the schistosomiasis or to malnutrition,

but the standard of nutrition in the area is good. Whether it is primarily the schistosomiasis which causes the cirrhosis, or whether this is precipitated by a state of malnutrition due to the schistosomiasis, the fact remains that in the absence of schistosomiasis liver cirrhosis is not found in this population.

A. R. D. Adams

Lipparoni, E. Presenza del *Bulinus abyssinicus* (V. Martens) nella zona del medio Uebi-Scebeli e rilievi sul suo habitat locale. [*Bulinus abyssinicus* **found in the Middle Reaches of the River Webi-Shebeli ; observations on its Habitat**] *Riv. di Parassit.* Rome. 1952, Oct., v. 13, No. 4, 309–14. English summary (3 lines).

Schistosomiasis of the bladder is a serious public health problem in Somaliland. For a long time " kadidick " (meaning " blood urine ") has been a common disease among the agricultural people who inhabit the banks and the adjacent valleys of the rivers Webi-Shebeli and Juba. These Somalis use the river and the irrigation canals for both ablution and drinking purposes. Indeed, in the dry season, nomadic herdsmen come to these water courses from areas further afield, and sporadic cases of vesical schistosomiasis have been observed among them from time to time.

Particulars are given in this paper about the local climate, the chemical and physical properties of this river water and the prevailing custom of collecting rain water in specially constructed basins known as " uar ". Wells, which are generally brackish, are another source of water supply.

Snail specimens have been collected from these various sources except the wells. Those obtained from " uar ", or artificial collections of rain water, belong to species which have no bearing on the present investigation. Very few specimens have been found in the river and the canal beds. Seepage water from these, on the other hand, yielded many specimens which were sent to Rome for identification, after being either fixed in formalin or kept alive by " packing in coal dust ". These included specimens of *Bulinus* (*Physopsis*) *abyssinicus*, often found in batches attached to aquatic vegetation or to other submerged detritus, generally in clear, more or less still, water.

The author quotes Clayton Lane for the statement, in 1936, that *Bulinus* or other vectors of vesical schistosomiasis had not then been found in Italian Somaliland [this *Bulletin*, 1936, v. 33, 11 : see also 1927, v. 24, 515].

J. Cauchi

Tadros, W. & Nor El-Din, G. **Hormonal Therapy in Vesical Tumours.** *J. Roy. Egyptian Med. Ass.* 1951, v. 34, No. 4, 329–39, 1 fig. [23 refs.]

" 1. 8 cases suffering from cancer of bladder associated with bilharzial history were given combined oestrogenic (ovobrene) and androgenic (testosterone propionate) therapy.

" 2. Marked amelioration in 7 of the cases was noticed.

" 3. Tumour size diminished considerably in 2 cases, and the adhesions disappeared almost completely in one of them.

" 4. Acid plasma phosphatase was estimated in 2 cases before and after treatment. The value diminished in both cases. The acid phosphatase estimation carried out in a number of cases before treatment varied from 5 to 22 units.

" 5. It is suggested that cystoscopy and examination of urine for cancer cells be carried out routinely, especially in cases, suffering from persistent strangury and haematuria.

"6. An explanation is offered for the prevalence of the disease among males, rather than females, although the females suffer from bilharziasis as frequently as do males."

GELFAND, M. & ALVES, W. D. **Terramycin in Schistosomiasis : a Trial in Six Cases.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 95–6.

"Five cases of schistosomiasis were unsuccessfully treated with terramycin in doses ranging from 1½ gm. daily for a period of approximately 16 days. The sixth case, a child aged 5 years who received 1½ gm. daily for 8 days, was also uncured."

ANTAKI, H. **Polarographic Determination of Antimony Blood Levels in the Stibophen Therapy of Schistosomiasis.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, Nos. 11/12, 772–85, 1 fig.

The polarographic method described [this *Bulletin*, 1944, v. 41, 20, 222] has been used [apparently under conditions not entirely satisfactory] for the estimation of antimony in the whole blood of patients infected with *S. mansoni* or *S. haematobium* who were undergoing therapeutic treatment with Stibophen. The full course consisted of injections of the drug equivalent to a daily dosage of 8·5 mgm. antimony per 12 kgm. of body weight on 10 consecutive days. Estimations were made at selected intervals to find if any correlation existed between curative effect and levels of antimony reached. A number of tables give the levels attained and indicate that there were wide individual variations.

J. D. Fulton

RIEDEL, H. Hexamethylentetramin als Vorbeugungsmittel gegen die Ausbreitung der Blasenbilharziose. [**Hexamethylenetetramine (Hexamine) as a Means of Preventing the Spread of Vesical Schistosomiasis**] *Klin. Woch.* 1952, Nov. 1, v. 30, Nos. 41/42, 993–5.

In Egypt the author sought by *in vitro* tests, the technique of which is described, a substance which will kill miracidia in the eggs of *Schistosoma* and so break the cycle between man and the snail intermediate host. Numerous substances were tried and it was found that hexamine killed the miracidia. When a 1 : 2,000 solution of this substance in acid human urine containing about 200 eggs of *Schistosoma* was kept at 37°C. for 2 hours, the eggs set free, after a few minutes, miracidia practically unchanged in form, but completely motionless, which remained beside the empty shells. Not a single motile miracidium was seen and the author concluded that 85 to 90 per cent. of eggs capable of hatching had been killed. In control preparations made with the same urine without hexamine, most of the miracidia hatched in 10 minutes to 2 hours and actively swarmed about.

Experiments showed that a dose of 1 gm. of hexamine taken by the mouth before going to sleep in the evening, was enough to kill eggs voided in the urine next morning. The urine had a *p*H of about 5. Urine voided 3 to 8 hours after taking the dose of hexamine was ovicidal.

To 3 patients 2 gm. hexamine in water were given before they went to bed, together with 5 gm. ammonium chloride to make the urine acid, and their urines were collected next morning. The first patient, aged 13, was lightly infected. In a sample of his urine about 50 eggs were found, which liberated active miracidia. In the urine collected after the dose of hexamine about 50 eggs were again found, but none of the miracidia that hatched from them was

active. They were all motionless beside their egg-shells. The second patient, aged 18, had a moderate infection, with about 200 eggs in his urine sample, which liberated active miracidia. The morning after the dose of hexamine about 250 eggs were found, but all the miracidia were motionless beside their shells. The third patient, aged 19, had the severest infection ever seen by the Department of Parasitology of the King Fuad University. Thousands of eggs were present in urine samples. The morning after the dose of hexamine the urine contained about 3,000 eggs, but only 3 active miracidia were found and these showed only feeble movements of their apical cilia, and after ¼ hour these movements ceased. All the other miracidia were killed. Shaking of the urine for 5 hours failed to stimulate any miracidia to activity.

It was then found that eggs from urine, washed and left in a 1 : 1,000 solution of hexamine, set free normal miracidia, which hatched out in the same time as miracidia in normal urine. This suggested that it is not the hexamine itself which kills the miracidia, but the formaldehyde formed from it in acid urine. The author remarks that it will be difficult to find out whether the hypothetical intermediate products methylene-aminomethyl alcohol and imino-methyl alcohol also take part in the ovicidal action. Results of the treatment of a larger number of patients will be published later. *G. Lapage*

DE LUCENA, D. T. Epidemiologia da Schistosomose mansoni. (Relatório.) [**Epidemiology of Schistosomiasis due to** *S. mansoni*] Reprinted from *Anais Soc. Med. de Pernambuco.* 1950, July, v. 2, No. 1, 11–27, 4 maps & 1 graph.

This is a useful general review of the subject, giving the main points relative to the source of this infection, showing that Africa was the cradle of the disease and that, according to Ruffer's investigations, it existed, the *haematobium* species at least, in ancient Egypt, ova having been found in mummies of the 20th dynasty. The author goes on to describe the geographical distribution of *S. mansoni*, with maps showing its existence in Africa, Madagascar and the Americas, and another giving in more detail the prevalence in different parts of Pernambuco among schoolchildren ; in some areas it is more than 20 per cent. A fourth line-map shows by cross-hatching, the parts infested by *Tropicorbis centimetralis* and *Australorbis glabratus olivaceus*. Several other snail species are mentioned, such as *A. tenagophilus*, *Tropicorbis janeirensis*, *Bulinus tropicus* (in Natal and Rhodesia) and *Biomphalaria alexandrina pfeifferi*, *T. nigrilabris*, *T. incertus* and *T. paparyensis*. Though read at (at least published by the Annals of) the Pernambuco Medical Society, the paper covers too wide an area for much space to be given to Pernambuco itself.

H. Harold Scott

OTTOLINA, C. Valor absoluto de la biopsia rectoscopica por transparencia estudiado en –138– rectos humanos enteros preparados con una tecnica adecuada. [**The Value of Rectal Biopsy by the Transparency Method (illustrated by) 138 Specimens of Human Recta (for Diagnosis of Infection by** *Schistosoma mansoni*)] Reprinted from *Rev. Policlínica Caracas.* 1951, Mar.–Apr., v. 19, No. 117, 79–151, 23 figs. [15 refs.] English summary.

The process and method of Dr. Ottolina here detailed have been referred to previously in this *Bulletin* [1948, v. 45, 193] but in the interval the procedure has been amplified and elaborated. It is particularly useful in cases where clinical signs point to infection by *S. mansoni*, but examination of the faeces for ova is persistently negative. Before speaking of the value of rectal biopsy

for diagnosis of living patients, the author goes, in minute detail, into the conditions found by examination of larger portions, 20 sq. cm. or so, of the rectal mucosa in the post-mortem room and enumerating the total count of ova. He divides cases into 4 categories : I. Minimal, with 1,000 ova or less ; II. Moderate, between 1,000 and 10,000 ; III. Severe, between 10,000 and 20,000 ; IV. Very severe, above 20,000. The whole of the fragment removed is divided into 2 halves by a marking with Indian ink and each half into two quadrants and the quadrants into zones, 3 on each side above the medial rectal valve and 2 on each side below it, between the valve and the anal sphincter, and the valve area itself into a right and left half. To facilitate counting the tissue is rendered transparent and mounted on a thin transparent celluloid sheet divided into squares of 3 mm. side and clamped to the tissue. If ova are very numerous these areas of 9 sq. mm. are subdivided into 9 squares each 1 mm. square. The tissue is studied for worms and for ova containing miracidia indicative of recent and active infection ; infection is also regarded as active if worms are present and ova (even if the ova are dead), or if fresh ova are seen but no worms ; if dead ova only are seen the conclusion is " indefinite ". In addition to worms and ova any nodules present must be studied for ova and their residue, and polypi for ova in their tissue. The object of the transparency is that deeper layers may be examined and the presence of ova not be missed.

One group of 125 were studied in the post-mortem room of the Vargas Hospital of " forensic " cases, *i.e.*, sudden deaths occurring in those in apparent good health, suicides, accidents at work or on the roads. Forty-two of these were found to be infected with *S. mansoni*. Of another 13 from the hospital wards 8 were infected, relatively nearly twice as high a proportion.

Examples are given of the numbers of ova in each of the 12 zones—the six above the valve, the 4 below and the two zones of the valve itself. In one there was an average of 39·9 per sq. cm., 8,672 altogether, and in another 8 per sq. cm., 1,796 altogether. Among 138 recta examined 50 were found positive ; 6 minimal (category I), 9 moderate (category II), 6 severe (category III) and 29 very severe (category IV).

By comparison of the results of the total count and of that obtained from the medial rectal valve (from which living specimens are usually taken) the author seeks to establish the " absolute value " of biopsy specimens taken from the biopsy area. Among the 50 positive for ova there were 25 showing the worms themselves. Altogether 328 worms were seen, 141 males, 187 females ; 145 (64 male and 81 females) in the right half ; 183 (76 males, 107 females) in the left half ; in the two upper quadrants, *i.e.*, above the rectal valve, there were 93 worms (37 males, 56 females) and in the two lower quadrants 205 (91 males, 114 females). [The remaining 30 (13 males, 17 females) must have been in the valvular zone.] In all but one of the 50, positive ova were seen in the valve zone. Several of the ova were observed to contain living miracidia in active movement, showing that evolution takes place actually in the human intestine. Tables are produced showing the numbers of ova and their condition, living or dead, in the different zones of the specimen and in the valvular area.

Nodules indicate tissue reaction. In 23 of the 50 there were 6, with a total of 5,875 nodules ; in the other 27 there were 7. In 4 cases where nodules were seen in the valvular zone they numbered altogether 335. These nodules were found altogether in 10 of the 50 examined. Of the total 138, rectal polypi were seen in 4 ; two among the 50 positive and each contained many ova.

In all the 50, a biopsy fragment from the valvular zone yielded a positive result ; it is acknowledged, however, that when ova are scarce a fragment may be taken which shows none, though infection is, in fact, present. Obviously the larger the fragment taken for biopsy the greater the likelihood of obtaining

a positive result ; this is axiomatic. Study was next made as to the part of the valve most likely to give a positive result and, when ova are found, it is shown that the main central part contains more ova than do the angles and the number of ova in the valvular zone runs fairly parallel with the intensity of infection shown in the other zones. Thus, in category I (6 cases) the ova in the valve would be up to 9 ; in category II (9 cases) 10 to 49 ; in category III (6 cases) 50 to 99 and in category IV (2 cases) over 100 in the valve zone.

Details of the technique of preparing and mounting the specimen, clearing it for transparency and cementing it are given minutely. Those interested should consult the original ; limits of space preclude our giving them here. Finally, there are some tips or wrinkles on what *not* to do in thus preparing the tissue ; for example, the balsam which is the basis of the cement must not contain any residual xylol because it may dissolve the balsam and loosen the cement ; also the addition of substances, as anhydrous calcined magnesium oxide to accelerate solidification of the edge of the preparation must be done with much caution. The whole paper is very interesting and intensely practical. *H. Harold Scott*

Bueding, E., Peters, L., Koletsky, S. & Moore, D. V. **Effect of Respiratory Inhibition on** *Schistosoma mansoni*. *Brit. J. Pharmacol. & Chemotherapy.* 1953, Mar., v. 8, No. 1, 15–18.

When rabbits infected with *S. mansoni* were treated with a cyanine dye it was found that parasites recovered from them possessed normal glycolytic activity, but that their respiration was reduced (Bueding *et al.*, *Federation Proc.*, 1947, v. 6, 313). The effect of repeated doses of this dye on the same parasites infecting hamsters has now been investigated. The drug was given intraperitoneally as a 0·125 per cent. solution in physiological saline. The hamsters were infected by injection of cercariae or exposure to them in water, and ova appeared in their faeces 6 to 8 weeks later. When hamsters were killed 24 hours after the end of treatment worms were obtained from the portal veins and their biochemical properties were studied.

In 4 experiments treatment was begun first 7 weeks, then 9 days, 27 days, and finally between 30 to 40 days after infection. No chemotherapeutic effect was obtained as judged by the number of ova passed by treated and untreated animals, as well as by other criteria, when treatment was started after 7 weeks. There was delay in appearance of ova with reduced viability, reduction in number of worms in portal veins, and less damage to liver when treatment was started 9 days after infection, and 0_2 uptake by worms was again reduced. Similar or even better results were obtained when treatment was begun 27 days after infection. Comparable results were obtained in the final experiment.

The poorest results were obtained by a short period of treatment after maturation of the worms. A limited chemotherapeutic effect was obtained when therapy was started before maturation and continued over a considerable period. The results suggested to the authors that dependence on aerobic metabolism is greater before maturation of the parasite, and that in general oxidative metabolism is not important in *S. mansoni*. *J. D. Fulton*

Stirewalt, M. A. & Evans, A. S. **An Unsuccessful Attempt to protect Mice against** *Schistosoma mansoni* **by Transfer of Immune Rat Serum.** *Proc. Helminthological Soc. of Washington.* 1953, Jan., v. 20, No. 1, 15–19. [11 refs.]

"Seventy albino mice, 41 of which had been given 2·1 ml of immune rat serum subcutaneously in divided doses, immediately before, just after, and

4 weeks after exposure to 100 cercariae each of *Schistosoma mansoni* were autopsied and the adult worms recovered and counted. No significant difference in worm burden was found between any of the groups and the 29 controls, which had received neither serum prophylaxis nor therapy.

" From the above results, it is concluded that, at the dosage level employed, the active immunity of albino rats to *S. mansoni* was not established passively in albino mice by the transfer of serum."

[See also this *Bulletin*, 1952, v. 49, 64.]

WEINBACH, E. C. **Studies on the Intermediary Metabolism of the Aquatic Snail, *Australorbis glabratus*.** *Arch. Biochemistry.* 1953, Feb., v. 42, No. 2, 231–44. [30 refs.]

KAGAN, I. G. & LEE, Chang-ling. **Duration of Acquired Immunity of *Schistosomatium douthitti* Infections in Mice following Treatment.** *J. Infect. Dis.* 1953, Jan.–Feb., v. 92, No. 1, 52–7. [18 refs.]

JARPA, A., MARTINI, J., GONZÁLEZ, O. & SAAVEDRA, J. Distomatosis humana. [**Human Distomatosis**] *Rev. Med. Chile.* 1952, July, v. 80, No. 7, 422–4, 2 figs.

An account of 2 cases in Chile.

TÄHTI, E. **The Fish Tapeworm. Occurrence in Children in the Finnish Lake Area.** *Ann. Med. Exper. et Biol. Fenniae.* Helsinki. 1953, v. 31, No. 1, 46–7, 2 figs.

In an area of 602 sq. km. in Central Finland, with 9,868 inhabitants, there are many lakes. The author examined the stools of 1,226 elementary school-children aged 7–15 and found *Diphyllobothrium latum* in 194 (15·8 per cent.). The results varied in different school districts ; the author therefore attempted to correlate the occurrence of the fish tapeworms with the percentage of lake area in each school district. A graph shows some increase in *Diphyllobothrium* infection as the lake-covered area increases, though the curve is irregular. Further observations are promised. *H. J. O'D. Burke-Gaffney*

NYBERG, W. **Microbiological Investigations on Antipernicious Anemia Factors in the Fish Tapeworm.** *Acta Med. Scandinavica.* 1952, v. 144, Suppl. 271, 68 pp., 14 figs. [Numerous refs.]

Infection with the fish tapeworm, *Diphyllobothrium latum*, occurs in about 20 per cent. of the population in Finland and in a small percentage of those thus infected pernicious tapeworm anaemia develops. The problem is therefore a serious one from a socio-medical point of view.

The rôle of the tapeworm in the production of this anaemia is not fully understood. The most recent investigations suggest that absorption by the tapeworm of vitamin B_{12} (with or without other essential food factors) in the upper part of the intestine, before the host has been able to utilize it, is the cause of the anaemia. There is also evidence of a factor in the tapeworm that inhibits haemopoiesis.

In the present investigation an attempt has been made to estimate the vitamin B_{12} content of *Diphyllobothrium latum*, *Taenia saginata*, and *Ascaris lumbricoides*. The methods used were microbiological estimation with *Lactobacillus leichmannii* (4797) and with *Euglena gracilis* and by paper chromatography in conjunction with these microbiological methods. There was a considerable degree of agreement between the results obtained by the different methods.

Watery extract of *D. latum* showed an average of 2·3 μgm. of B_{12} per gm. of dried worm, that of *T. saginata* 0·046 μgm. and that of *A. lumbricoides* 1·8 μgm.

Watery extracts of the worms contained small quantities of microbiologically active alkali-stable fractions and, in the case of *D. latum* extracts prepared in the same way as liver extract, had the same clinical effect as vitamin B_{12}.

Watery extracts of each worm showed no inhibiting factors, nor did the alcohol or acetone extracts of *D. latum*.

Paper chromatography showed that the watery extracts of *D. latum* contained desoxyribosides of guanine, cytosine and thymine and two other unidentified substances demonstrable by the same technique, and that extracts of the other two worms showed the desoxyriboside of guanine. *L. E. Napier*

See also p. 553, VON BONSDORFF & GORDIN, **Treatment of Pernicious Anemia with Intramuscular Injections of Tapeworm Extracts.** *Diphyllobothrium latum* **and Pernicious Anemia XIV.**

VANBREUSEGHEM, R. & WANSON, M. Echinococcose primitive intra-épidermique et chromoblastomycose en lésions associées. [**Intra-Epidermal Primitive Echinococcal Infection and Chromoblastomycosis in Associated Lesions**] *Ann. Soc. Belge de Méd. Trop.* 1952, Dec. 31, v. 32, No. 6, 679–82, 2 pls.

The following is a translation of the authors' summary :—

The authors discovered a double infection by *Echinococcus granulosus* and *Phialophora pedrosoi* in a single lesion occurring in an African woman in the Belgian Congo. They put forward a number of hypotheses to explain this coincidence, which they believe to be due to chance. They consider that the intra-epidermal localization of the echinococcus cyst was made possible by the acanthosis provoked by *Phialophora pedrosoi*. *H. J. O'D. Burke-Gaffney*

NÁQUIRA, F., TAGLE, I. & NEGHME, A. La hemolisis condicionada en el diagnóstico de la hidatidosis. Comunicación preliminar. [**Conditioned Haemolysis in the Diagnosis of Hydatid Disease**] *Bol. Informaciones Parasitarias Chilenas.* 1952, Oct.–Dec., v. 7, No. 4, 52–3.

The English summary appended to the paper is as follows :—

" The conditioned hemolysis test was used as diagnostic procedure for hydatid disease. The test was positive in all of 21 patients with hydatid cyst and negative in 23 healthy persons."

ROBERTSON, G. H. **Hydatid Cyst of the Heart simulating an Aneurysm. A Correction.** *New Zealand Med. J.* 1952, Dec., v. 51, No. 286, 388–9, 2 figs. on pl.

RODRÍGUEZ-MOLINA, R. & OLIVER-GONZÁLEZ, J. **Studies of Hookworm Disease in Puerto Rico. Preliminary Report.** *Bol. Asoc. Méd. de Puerto Rico.* 1952, Oct., v. 44, No. 10, 379–83.

Ankylostomiasis has been decreasing as a cause of death in Porto Rico for the last 30 years ; in 1923 to 1933, 82 deaths per 100,000 were due to this infection and in 1934 the figure had fallen to 34 and as low as 0·9 in 1950. At the turn of

the century, it was estimated that 90 per cent. of the population were infected. Nevertheless the infection is still serious and produces severe anaemia.

Nine white males, aged 17 to 25, who were heavily infected, were subjected to investigation in hospital and were subsequently followed for a period of 7 years. Stool egg counts showed 25,000 to 134,000 eggs per gm. of stool ; the red cell counts were between 2·2 and 4·0 millions per cmm. and the haemoglobin 4·0 to 7·4 gm. per 100 ml. Parenteral liver extract made no difference to the anaemia, but there was a striking improvement on oral iron in all cases, up to a certain point. However, a slight hypochromic anaemia remained in all cases until an anthelmintic was given. After 1,063 to 2,979 adult *Necator americanus* had been removed, the patients were discharged but kept under observation. In all cases the blood picture improved to normal within 4 months. After a year in their normal home environment all but one remained in good health without anaemia. At the end of 7 years 2 patients had died, one of pulmonary tuberculosis and one of vague symptoms including anaemia ; as the latter patient had shown 60,450 hookworm eggs per gm. of faeces, it seemed possible that this was a contributory cause. Of the remaining patients several showed a moderate degree of anaemia and all but one had higher egg counts than before treatment 7 years earlier, but all were now in much better health.

The authors conclude that " the anemia found in heavily infected individuals is not entirely produced by the parasites, but rather is the result of a combination of prolonged inadequate diet prevalent since childhood and an early acquired and continued parasitism ".

They further add :—" the problem of hookworm disease in Puerto Rico is mainly an economic one and no form of treatment . . . is the final answer ". [While this is true, the authors have demonstrated the great value of a thorough course of treatment. A point that they do not seem to emphasize is the age factor ; undoubtedly these patients' hookworm loads had reached a seriously heavy level in childhood or early adolescence. Given breathing space, although they had again built up heavy worm loads, these patients had not been seriously affected, since in the meanwhile as adults with past experience of the disease they had also acquired an immunity to the effects of the infection.]

L. E. Napier

Rizzotti, G. Risultati della cura con violetto di genziana per via orale nella infestazione da *Strongyloides stercoralis*. [**The Results of Treating Infestations of *Strongyloides stercoralis* by the Ingestion of Gentian Violet**] *Riv. di Parassit.* Rome. 1952, Oct., v. 13, No. 4, 315–20. English summary (5 lines).

The author in Ethiopia has treated 38 adults infested with *Strongyloides stercoralis* by oral administration of Meroxyl capsules (Wander) each containing 0·06 gm. of gentian violet. The capsules were taken one hour before meals 3 times a day in courses of 50 capsules aggregating 3 gm. of the drug. The treatment was controlled by the examination of at least 4 successive specimens of faeces taken between the 40th and the 60th days after finishing a course of treatment. Treatment had to be repeated a second time in 25 cases, a third time in 15 and a fourth time in 9 with 15, 9 and 5 failures respectively to eradicate the parasite. Four patients failed to complete their attendance—1 after the first course, 2 after the second and another after the third course of treatment.

The author emphasizes the fact that this helminth inhabits the duodenum and that the drug has to act as soon as it has passed the pylorus ; at the same time it has to be coated because of its irritant action on the stomach. In the form which he has used, gentian violet has failed to cure a proportion of the cases treated.

J. Cauchi

Coutinho, J. O., Croce, J., Campos, R. & Amato Neto, V. Resultados obtidos com o emprêgo da dietilcarbamazina (Hetrazan) no tratamento da estrongiloidíase. [**Strongyloidiasis treated with Hetrazan**] *Hospital.* Rio de Janeiro. 1952, Sept., v. 42, No. 3, 339–43.

The English summary appended to the paper is as follows :—

" Ten cases of strongyloidiasis were treated with Hetrazan. Diagnosis and control of treatment were performed by the Baermann method, which seems to be the best technic for the diagnosis of *Strongyloides stercoralis* by the stool examination. Every patient has been followed up for some time after treatment and further stool examinations showed the persistence of infection in all of them."

Koutz, F. R. & Groves, H. F. *Strongyloides stercoralis* **from a Dog in Ohio.** *J. Amer. Vet. Med. Ass.* 1953, Mar., v. 122, No. 912, 211–13, 3 figs. [13 refs.]

See also p. 511, Ricci, Ricerche parassitologiche nell'isola d'Ischia. III.— Il parassitismo intestinale nella popolazione infantile. [**Parasitological Surveys in the Island of Ischia. III. Intestinal Parasites in the Child Population**]

See also p. 563, van Ginkel, Longinfiltraten met eosinophilie. [**Pulmonary Infiltrations with Eosinophilia**]

Shinozaki, T. & Hashimoto, N. **Immunological Study with Fluid in Body-Cavity of Pig-***Ascaris*. *Acta Path. Japonica.* 1951, Oct., v. 1, No. 4, 237–46, 12 figs. on 3 pls.

The experiments, the results of which are described in this paper, fall into 3 groups. *Group I.* In these experiments 0·1 cc. of the body fluid of *Ascaris lumbricoides* var. *suis* was injected subcutaneously into a series of white rats which were killed at intervals of 30 minutes, 1 hour, 2 hours, 5 hours, 10 hours, 24 hours, 48 hours and 72 hours after inoculation. The injected tissues from these animals were then fixed, sectioned and stained. The histological examination of the sections showed an inflammatory cellular reaction such as might be expected to follow the injection of a toxic substance, the reaction reaching its maximum 12/24 hours after the injection and tending to localize within 72 hours.

Group II. In these experiments a similar technique was followed but in addition to inoculating previously untreated animals, injections were made into rats previously sensitized by 3 intraperitoneal injections, given every other day, of *Ascaris* body fluid. The test inoculation was given 15 days after the last sensitizing dose. The histological examination of the tissues from these animals showed that the reactions in the controls were as previously described, but the tissues of the sensitized animals showed, in addition to the inflammatory reaction, very marked allergic changes which are described in detail. In order to substantiate the view that these findings were due to allergy resulting from previous sensitization, the authors also injected animals previously sensitized and subsequently de-sensitized by further injections of *Ascaris* body fluid. In these animals no marked toxic or allergic reactions were demonstrated.

Group III. In these experiments *Ascaris lumbricoides* larvae were immersed in serum obtained from normal rats and in serum obtained from " immune rats ". [In this group of experiments the term " immune rats " appears to apply to rats which had received the same treatment as was previously employed to produce sensitization.] It was observed that the larvae immersed in the " immune serum " were surrounded with precipitate and their movements

became very sluggish. In the control sera the active movements of the larvae remained unaltered and although a precipitate was sometimes produced it was never as dense as in the immune sera. [The authors' references are mainly to the work of previous Japanese investigators and make no mention of the important papers published by J. F. A. Sprent (this *Bulletin*, 1950, v. 47, 145, 1108; 1951, v. 48, 823; 1952, v. 49, 786).] *R. M. Gordon*

Elsdon-Dew, R. **Heterodera in Man.** *South African Med. J.* 1953, Feb. 14, v. 27, No. 7, 140–41, 7 figs.

The egg of the eelworm of plants (*Heterodera*) is not uncommonly found in human faeces and is liable to be mistaken for that of a pathogenic helminth.

In the author's experience the eggs seem to be appearing more frequently and were in fact found in 9 of 1,013 apparently normal Africans in Durban. Multiple instances were recently found in a hospital: such "outbreaks" are likely when infected land is used for raising food crops, and the incident quoted was traceable to infected potatoes which had lain on the ground for some time.

The life-cycle of the worm is described and illustrated in 7 excellent photographs and photomicrographs.

The eggs as seen in the faeces are 80–120 μ long by 20–40 μ broad: in the younger stages they are concavo-convex, hyaline, with rounded ends, thin shells and terminal "air-sacs". The embryo, at first granular, eventually develops into a many-coiled motile larva: during development the concavity and the "air sacs" may disappear and the egg becomes plano-convex or even biconvex. The eggs appear to be resistant to digestive juices and may be seen intact and even alive in the faeces. It is clear that at different stages of development the egg may resemble superficially that of an infertile *Ascaris*, later a hookworm or *Strongyloides* and finally an *Enterobius*. The diagnostic importance of this is emphasized. [See also this *Bulletin*, 1952, v. 49, 529.] *H. J. O'D. Burke-Gaffney*

Ferreira, M. de O. & Ferraz, D. M. Da presença da filariose bancroftiana em Ponta Grossa, pequena localidade do município de Florianópolis, Estado de Santa Catarina. [**Presence of *W. bancrofti* in Ponta Grossa, a Small Village in the State of Santa Catarina, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Jan., v. 4, No. 1, 65–8, 3 figs. on 3 pls.

The English summary appended to the paper is as follows:—

"Examining the blood of 122 persons from a little village (Ponta Grossa) of the coast of Santa Catharina State (south of Brazil), the authors found 17 (13·9%) with microfilaria of *Wuchereria bancrofti*."

Rachou, R. G. & Deane, L. M. Os primeiros passos do Serviço Nacional de Malária em sua campanha contra a filariose bancroftiana no Brasil. [**First Steps in combating Filariasis due to *W. bancrofti* in Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Apr., v. 4, No. 2, 187–91. English summary.

Three species of filaria have been known to be present in Brazil, *viz.*, *Dracunculus medinensis*, in a lake in Feira de Sant' Ana, *Wuchereria bancrofti* in many districts, and *Mansonella ozzardi*, found in Manaus in 1949. The first of these is no longer found, prolonged drought having dried up the lake and killed the intermediate hosts. In Belém, Pará State, Causey *et al.* reported finding a filarial index of 12·1 per cent., microfilariae in 10·8 and elephantiasis in 1·3 per

cent. of 5,000 persons examined [see this *Bulletin*, 1945, v. 42, 647] and in 1948 Maria DEANE examined 2,405 persons and found *W. bancrofti* embryos in 2 per cent. and *M. ozzardi* in 0·6 per cent. In Salvador, Bahia, PESSÔA and ANDRADE in 1949, among the relatively small number of 934 examined, found 4·6 per cent. with *W. bancrofti* embryos in their blood, and 12·5 per cent. of *Culex fatigans* captured in the houses were infected [see this *Bulletin*, 1950, v. 47, 1111]. In 1951, the authors found, in a survey in Belém, among 8,588 persons distributed over the town, filarial embryos in the blood of 9·8 per cent. ; lastly, in Ponta Grossa, FERREIRA and FERRAZ in 1952 found, among 122 examined, microfilaraemia in 13·9 per cent.

Measures undertaken to deal with the conditions include an intensive course of instruction of 3 weeks to train technicians, the planning of several more surveys, the spraying of houses every 3 months with benzene hexachloride, 300 mgm. of the gamma isomer per sq. metre, antilarval measures and the treatment with hetrazan of persons infected. *H. Harold Scott*

EDGAR, S. A., BEYE, H. K. & MILLE, R., with the technical assistance of B. BAMBRIDGE & LAMARQUAND. **A Preliminary Report on a " Periodic Tendency " of Microfilariae of** *Wuchereria bancrofti* **observed in Tahiti, French Oceania.** *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 1009–19, 3 figs. [13 refs.]

Apart from the " non-periodicity " of microfilariae in the peripheral blood, there is, according to these workers, little evidence that the parasite in the Pacific is not the type form, *Wuchereria bancrofti*, and it is tentatively considered as such in this paper.

Recently EYLES and colleagues [see this *Bulletin*, 1947, v. 44, 837], while studying filarial densities in two subjects who had contracted filariasis in the Society Islands and Tonga, found that both exhibited microfilarial peaks between noon and 8 p.m.

During the present filariasis investigations in Tahiti the microfilarial densities in the blood of a number of Tahitians were studied at different times of the day in order to determine any such periodicity.

Groups from all parts of Tahiti included both sexes, ranging in age from 7 to 69 years. The technique of BRADY and LAWTON (*J. Parasitol.*, 1944, v. 30, 34) was used in the first 3 trials, consisting of drawing accurately 20 cmm. samples of blood from a finger puncture. Each sample was then diluted with 1 cc. of 0·1 N. HCl delivered into a Sedgwick-Rafter counting chamber and immediately counted. In all other phases of this study counts were made from thick blood films, each containing 20 cmm. of capillary blood. After dehaemoglobinization films were fixed in 100 per cent. methanol and stained with 1 : 20 dilution of Giemsa for 15–20 minutes. All smears were surveyed with the aid of an ocular guide or Whipple disc and all counts were made by the same two persons. A preliminary study of variation in microfilarial density found in sampling two subjects showed that the counts ranged from 43 to 63 and from 44 to 77 with means of 51·5 and 59·8 and standard deviations of 6·67 and 12·08. The statistical analysis provides for the fact that the ranges may vary widely depending upon the magnitude of the counts.

In the first two periodicity studies 26 persons were examined by counts of microfilarial density on 4 specimens of blood drawn at intervals during a 24-hour period. In all but two the greatest counts were registered during the afternoon.

An analysis of variance was conducted on the data compiled ; for statistical considerations this was computed by employing the square roots of the counts. These showed no significant differences in total microfilariae within the two a.m.

periods 01.45–06.30 hours, compared with 07.45–09.47, or with two p.m. periods 13.13–17.35 compared with 19.30–20.30. A further attempt was made to ascertain more definitely the time of day at which microfilariae are most, and least, numerous in the peripheral blood in specimens drawn four times between the hours of 06.05 and 09.50 and four times between 18.00 and 21.00 : with the exception of one subject, *all* persons exhibited more microfilariae in the evening than in the morning.

The data were analysed by a technique that eliminated person-to-person differences and again a substantial increase was registered in the afternoon with a possible peak at 19.00 hours. To ensure that this tendency to an evening influx of microfilariae was not limited to one community three others were studied at widely separated points with the result that 12 out of 13 in group A, 12 out of 15 in group B and 15 out of 21 in group C showed fewer microfilariae in the morning than in the evening. When all cases showing maximum densities of less than 15 microfilariae are eliminated from these results, only 2 out of 39 did not exhibit more microfilariae in the evening than in the morning.

Five children from group C were selected to ascertain if the rhythmic fluctuation was consistent over a long period of time when examined at 07.00 and 19.00 on six days over widely spaced intervals during one year. All, with one exception, exhibited more microfilariae in the evening than in the morning. This was confirmed more or less in 19 other subjects, who were being used in vector experiments.

The question of a possible seasonal fluctuation was raised and the results of a single monthly examination of 25 positive persons during a period of one year estimated : all were examined at least 8 times with the same techniques. The scores recorded vary from 36½ in January to 87 in April. If the level in all months was roughly the same a total score of 65 each month could be expected, but they differ significantly ($P < \cdot 01$, using the Chi-square test) from the expected value of 65. It was not possible to determine whether this difference was due to a seasonal pattern or whether there had been an increase in the level of infection during this period.

It therefore appears probable that a rhythmic fluctuation in numbers of microfilariae in the peripheral blood is characteristic of filariasis in several South Pacific islands, but these fluctuations do not reach the pronounced proportions seen in *W. bancrofti* in other parts of the world. Nor does the *maximum* take place at the same time of day : in Tahiti the peak appears to be between 6 and 7 p.m., rather than between 10 p.m. and 2.0 a.m.

Periodic fluctuations of microfilariae of this type are more striking in children than in adults.

[The curves of the partial, or *crepuscular* periodicity, illustrated in the charts show no very pronounced rises, involving an increase of about some 20 microfilariae per 20 cmm. This may possibly be due to the fact that the cases selected were really not heavily infected. It is therefore possible that with more massive microfilaraemia the curves would be more accentuated ; but surely the designation " diurnal " [Concise Oxford dictionary : " diurnal=occupying one day, of the day, not nocturnal "] as suggested for these minor fluctuations is hardly justifiable, as it must be retained solely for these microfilariae (*L. loa*) which maintain a complete day-time periodicity. There therefore appears to the reviewer to be much ado about not very much, for similar small fluctuations of a semi-nocturnal character have been proved for *Dirofilaria immitis* and *D. repens* in dogs.

The results of this carefully conducted research do not in any way influence the reviewer's conviction on the significance of non-periodicity of the Pacific filaria (*W. pacifica*) and this question appears to have been definitely settled by the recent work of HAWKING [this *Bulletin*, 1953, Aug.]. In his investigations on

the non-periodic microfilariae of Fiji the reviewer encountered considerable fluctuations in microfilarial counts in taking successive samples of measured blood from the fingers and ear and also in successive counts of capillary blood extracted from the same finger under varying degrees of pressure in the same person at different times of the day. The coefficients of variation were almost the same order as recorded in this paper.] *Philip Manson-Bahr*

DE FIGUEIRÊDO, A. Diagnóstico da bancroftose. [**Diagnosis of Bancroftiasis**] *Hospital.* Rio de Janeiro. 1952, Oct., v. 42, No. 4, 523–8, 1 fig. [16 refs.]

The author prefaces his remarks on *Wuchereria bancrofti* infection by statements on the various filariae which occur in Brazil and elsewhere, *Onchocerca caecutiens*, *Loa loa*, *Mansonella ozzardi*, *Dipetalonema perstans* and *Dracunculus medinensis*. After mentioning different methods of detecting microfilariae in the blood, he concludes that the best, in his opinion, is that of HARRIS and SUMMERS [see this *Bulletin*, 1946, v. 43, 569]. He adds a preliminary note on an intradermoreaction, using as antigen extract of *Setaria equina* of the horse. In patients with elephantiasis carrying filarial embryos in their peripheral blood the inoculation of a 1 : 4,000 dilution yields a positive reaction in 15 minutes. Two controls, with lymphatic oedema of the leg, but with no filaria embryos in their peripheral blood, were negative to the test. The author rightly calls this a " preliminary note " and states that one of his assistants is going to follow it up. *H. Harold Scott*

NOR EL DIN, G. & EL TAMIMI, M. **Hetrazan in the Treatment of Filarial Manifestations.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, Nos. 11/12, 826–34. [16 refs.]

The present study included the trial of hetrazan in patients with elephantiasis of the limbs, elephantoid fever and lymphadenitis.

Among the 20 patients with elephantiasis of upper or lower limbs there were 10 from Rosetta—all of long-standing—and all were negative for microfilariae. These embryos were found in 3 only out of the series. In these and 3 others moderate reduction in the size of the limbs with hetrazan treatment [2 mgm./kgm., presumably thrice daily, for 10–30 days] was obtained ; allergic manifestations—swelling of the limbs, urticaria, fever and eosinophilia—occurred in 3 of the 6. The second group included 10 suffering from repeated attacks of elephantoid fever accompanied by lymphangitis. Five in the acute stage were positive for microfilariae. Hetrazan given in an average dose of 2 mgm. per kgm. [presumably thrice daily] for a week, caused curtailment of the fever and degree of swelling with amelioration of constitutional symptoms. In two, addition of pyribenzamine in a dose of 25 mgm. thrice daily aborted the attack in 2 days.

When monthly courses of hetrazan were given for a period of 6 months the patients were not liable to further attacks of elephantoid fever.

The third group included patients suffering from lymph-scrotum, hydrocele and lymphadenitis. One case of lymph-scrotum and one of hydrocele were moderately improved, but the swelling persisted. A third with inguinal lymphadenitis accompanied by chyluria improved with subsidence of the gland swellings. The work suggests that hetrazan may be of use only in certain early and mild cases of elephantiasis. In lymphangitis and elephantoid fever, however, results are more encouraging and the authors consider that this can be explained by the destruction of the microfilariae and the lethal action of the drug on the living adult worms. The exacerbation of lymphangitis in some cases is attributed

to allergy, which is prevented by drugs such as Histantin (a combination of a piperazine derivative and an anti-histaminic compound).

The combination of hetrazan and penicillin is advocated because of the complication of secondary infections.

Since 1949 the authors have used hetrazan in a group of 14 patients with chyluria. In 6 microfilariae were present in the blood ; in the urine in 5. Three cases of chyluria improved for about one year after hetrazan treatment, but on the whole this mode of treatment is not encouraging.

Philip Manson-Bahr

MANSON-BAHR, P. **The Action of Hetrazan in Pacific Filariasis.** *J. Trop. Med. & Hyg.* 1952, Aug., v. 56, No. 8, 169–73, 1 graph.

The author used hetrazan in the treatment of 6 Fijian patients, all of whom had microfilariae of *W. bancrofti* (of the non-periodic variety) in the peripheral blood ; the dose was 150 mgm. daily for 15 days or one month. After the treatment, examination was made of 20 cmm. of capillary blood, and of 1 cc. of venous blood haemolysed with 9 cc. of 2 per cent. formalin solution and centrifuged. Microfilariae could not be found in this quantity of capillary blood after treatment in 5 of the patients [the finding in the other patient is not recorded], but they were present in the centrifuged specimens from 5 of the 6 patients.

It is therefore evident that this dosage cannot be relied upon to clear the blood. It is to be noted that had only the 20 cmm. of capillary blood been examined, a different picture would have been presented ; only small numbers of microfilariae (2–7) were found in 1 cc. of venous blood. The author comments " These results confirm the generally accepted views regarding the action of hetrazan on the microfilariae in the peripheral capillary blood, but it is shown that clearance in this respect does not involve the venous circulation ". [This suggests that the capillary circulation was cleared, but it may be considered that the examination of more than 20 cmm. of capillary blood would be necessary to justify this conclusion.]

The author also fed 36 *Aëdes scutellaris pseudoscutellaris* on 2 patients who had been taking hetrazan (150 mgm. daily for 3 days) but whose capillary blood showed 4 microfilariae in 20 cmm. at the time of feeding. Unsheathed microfilariae were present in the blood clots in the stomachs of the mosquitoes, but no penetration of thoracic muscles took place. More work is obviously needed, but it seems likely that the hetrazan was a factor in preventing infection of the mosquitoes.

Charles Wilcocks

MANSON-BAHR, P. **The Fight against Filariasis in the Pacific.** *Nature.* 1953, Feb. 28, v. 171, 368–71. [29 refs.]

This is a compendium of the principal literature on filariasis in the Pacific, beginning, appropriately, with the author's own work in 1912 and extending to current studies, which include his further work some 40 years later in Fiji. Readers of this *Bulletin* will be familiar with the material reviewed, which has been abstracted extensively in it. This paper brings the main points together in a convenient form for those who wish to have an outline of the present position.

The review refers to the entomological position of the *Aëdes* vectors, the author's arguments that the Pacific filaria should be regarded as a separate species, the development of anti-mosquito work in Fiji and the setting up of the broader anti-filariasis campaign in the Pacific generally. The creation of the

South Pacific Commission in 1949 was a great stimulus to the work and the special investigations in Tahiti followed.

Mosquito control in the different islands is referred to and there is finally a review of the work on the control of filariasis with hetrazan : the difficulties of the latter method of prophylaxis as a mass measure are emphasized.

The author concludes that " it appears probable that ' species sanitation ' against the main vector, as had been practised in Fiji and Rarotonga, and now in Tahiti, promises to be the most effective measure in the ultimate eradication of Pacific filariasis. . . .". *H. J. O'D. Burke-Gaffney*

Lewis, D. J. *Simulium damnosum* **and its relation to Onchocerciasis in the Anglo-Egyptian Sudan.** *Bull. Entom. Res.* 1953, Jan., v. 43, Pt. 4, 597–644, 44 text figs. & 6 figs. on pl. [Numerous refs.]

During May to July, 1948 and August to November, 1949, the author carried out investigations in the field on *Simulium damnosum* and onchocerciasis in southern Sudan. The present paper reports the results and integrates them with previous findings from the Sudan and elsewhere where the disease occurs. Numerous aspects of the subject are investigated and discussed : the distribution of *S. damnosum* and onchocerciasis in the Sudan, breeding and biting habits of the fly, changes in the appearance of the adult and its physiological state in relation to age and blood-meals, the course of the development of *Onchocerca volvulus*, other species of *Onchocerca* in animals, other parasites found in *S. damnosum*, and, in conclusion, the measures for the control of the fly and onchocerciasis which are practicable in the Sudan. The distributions of the fly and the disease are shown on maps. Most of the many figures illustrate the internal anatomy of the adult fly, and the nature of the peritrophic membrane in relation to the blood meal and ingested microfilariae ; there is one figure of several sorts of parasites seen in the fly, other than *O. volvulus*. Breeding places, and the environment of the adult fly are depicted in 6 photographs.

For experimental work adult flies were bred out from pupae kept in muslin-covered tubes (about 3 ins. × 1 in.) containing at the bottom a pad of wet cotton wool covered by a piece of waxed paper. The pupae remained on the vegetable stems on which they were collected. Emerged adults were kept in groups in 2 ins. × 1 in. tubes, a filter paper base and vertical strip being provided in each tube ; it was closed with muslin on top of which a piece of cotton wool soaked in sugar was supplied as food. Numerous tubes were kept over water in a 4-gallon tin covered with cloth. This method maintained temperatures between 23 and 26°C. and a high humidity. Although many deaths occurred within the first day or two, particularly after a blood meal, useful numbers lived for about a week and a few as long as 11 days.

Examination for microfilariae, sausage forms, and vermiform larvae of *O. volvulus* was made by crushing the flies, less wings and legs, between slide and coverslip. Flies preserved in 70 per cent. alcohol and later crushed in a chloral-gum mountant (Puri's medium) were also satisfactory for observations on worm infections. Full details are given of methods used for sectioning flies. In the field, methods of survey consisted of catches of fly coming to human beings, of pupal collections, and of xenodiagnosis which was found convenient as a means of detecting human carriers of microfilariae in some places.

S. damnosum occurs widely over the river systems of the Sudan but only in large enough numbers to be a pest and vector of onchocerciasis mainly on tributaries of the Nile in south-west Sudan. Usually, rapids are characteristic of these foci of fly and the disease, but there are places where either pupae but no adults were found or, despite apparently suitable breeding places, the species

is absent altogether. Seasonal drying-up of the river, or in one case, a continuously very violent current appear to explain the absence of *S. damnosum* ; but absence of adults in the presence of pupae is not explicable in this way, and remains a problem.

The main breeding season of *S. damnosum* in southern Sudan is the rainy season of May to October ; in the arid north (where onchocerciasis is not transmitted) breeding occurs later than the heavy floods but by April it diminishes when the hot dry season becomes unsuitable to the adults. Breeding has been observed on the Nile in calm stretches of flowing water in the absence of rapids. The flies disperse widely from their breeding places in the rains but are more localized and restricted, sometimes occurring in riverine bush far from rapids, in the dry season ; in this season it appears that some adults may survive by retiring to crevices in damp rock clefts on otherwise dried-up river beds. In the southern Sudan it is difficult to feel certain that all breeding places in the river system have been found. Nevertheless, there is little doubt that flight ranges of 10–30 km., and even greater distances, are not infrequent.

S. damnosum appeared to feed almost exclusively on man, were seldom seen on sheep, never on fowls, nor apparently on the common baboon. Pollen-grains in the gut, pollinia on their mouthparts, and several sugars analysed from the oesophageal diverticulum, indicate visits to flowers and their nectaries. Bites on man occurred chiefly below the knee. A fly feeds every 2 or 3 days—that is, once for each ovarial cycle. They would attack in practically any type of territory (open or bush) but not usually indoors, except when the eaves were much higher than the tops of the walls, giving good light inside the building. Biting occurred from before dawn until after dusk, but mainly in the 2 hours before sunset, in light rain and in full sunlight. Considerable fluctuations occurred in biting activity from day to day, a point to bear in mind in brief visits to places to assess potential risks of transmission of onchocerciasis.

The anatomy of the adult fly is described in connexion with estimating the age of flies and with the interpretation of their worm infections. Recently-emerged flies have clear whiteish halteres, the knob of which becomes opaque, owing to glycogen, after the first blood meal ; the abdomen is also thin before the first blood meal. Changes are reported in the accessory glands, spermatheca and fat body, in relation to the progress of blood digestion and ovarial development. Eggs have been laid as soon as 48 hours after a blood meal (when flies were handled) ; as many as 529 eggs have been laid in one oviposition.

Blood taken up at feeding never enters the oesophageal diverticulum, in which only the sugars, apparently from nectaries, have been found. The blood goes to the midgut and proceeds to distend the hinder half only. Over 1 cmm. of blood may be taken up. A laminated peritrophic membrane is secreted round the blood meal and, usually, completely encloses it. The number of microfilariae taken up by a fly is often 100 to 200 but the number of vermiform larvae developing is much lower (average about 3 per fly). There is considerable original evidence brought forward to show that many of the microfilariae are trapped within the peritrophic membrane which they cannot penetrate ; they die in the blood-mass. A few avoid this fate by passing rapidly to the haemocoele or escaping enclosure by being in the narrow fore-part of the gut, or the hind-gut or Malpighian tubes, as the membrane forms. In some flies the membrane may remain incomplete posteriorly, thus providing a route of escape for microfilariae. Microfilariae have been located very widely throughout the body, including the head and halteres. Sausage forms occur in the thorax, and vermiform larvae from the head to the abdomen by the seventh day of development.

In the field, the highest infection rate was 36 per cent. of 47 flies with various developing forms (8·5 per cent. with forms in the head). In this area the data collected suggested that a person would be infected with one worm every 3

minutes. More infective flies occurred beside a river than at 700 metres from it : this may be due to larger survival of flies near the river. Infective flies were found at 11 and 19 km. from breeding places. It is concluded that, on account of the wide dispersal of *S. damnosum*, large areas such as the whole valley of the River Sue for over 400 km. × 24–70 km. are subject to risk of transmission of onchocerciasis. The main transmission season is undoubtedly during the rains and over widespread areas ; not locally by rivers in the dry season. In one area in the dry season only 13 flies harboured the parasite (10 with vermiform larvae) out of 1,363 dissected. It is concluded that blindness, occurring in 1–10 per cent. of exposed persons, and other severe sequelae of onchocerciasis, develop only in areas of intense reinfection and an abundance of the vector. But many persons in endemic areas fail to show microfilariae in the skin. Incidence rates of 25 and 76 per cent. are recorded. The infected districts in the southern Sudan have a long dry season, poor soil, and are infested with *Glossina morsitans*. The population is therefore sparse and localized.

The paper concludes with a consideration of all the known methods of controlling *Simulium damnosum* and onchocerciasis, and their suitability for the southern Sudan. The largely undeveloped terrain difficult of access and the scattered distribution of the sparse population rule out any prospects of eradication of the vector by anti-larval or anti-adult measures consistent with practical economics. The following measures are recommended as practical means, according to local conditions, of giving a degree of protection from infective bites consistent with a low, and probably unimportant, amount of transmission. Clearing bush from dry-season watering places ; migration away from rivers in the rains ; careful siting of new settlements ; building designs for courts, schools, etc. which would ensure enough shade to discourage entry of *Simulium* ; wearing long trousers by educated people ; use of the repellent dimethyl phthalate [DMP] which was found to be effective for 7 hours, or on re-application to points where it is rubbed off, for 10 hours. It does not lose effectiveness with moderate perspiration and, applied to exposed skin at sunrise, needs only occasional re-application at the elbows and other friction surfaces periodically during the rest of the day. In an area (Mvolo township) where the local inhabitants experienced 200 bites an hour, persons using daily 4–5 cc. of undiluted liquid DMP, carefully as described above, suffered less than 5 bites a month. The Sudan Ministry of Health now provides DMP to the public at low cost. This, the most practical solution to the control of onchocerciasis in the southern Sudan, is likely, it is concluded, to give partial protection to some people and complete protection to a few. There seems no immediate prospect of devising better methods of protection for the southern Sudan. There is little or no risk of onchocercal foci being established in northern Sudan.

D. S. Bertram

Wanson, M. & Lebied, B. Note sur le cycle gonotrophique de *Simulium damnosum*. [**Note on the Gonotrophic Cycle of** *Simulium damnosum*] *Rev. Zool. Bot. afr.* 1948, v. 41, No. 1, 66–82, 8 figs. [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Jan., v. 41, Pt. 1, 13–14.]

Observations on the gonotrophic cycle in *Simulium damnosum* Theo. were made at Leopoldville, Belgian Congo, on females that had emerged from pupae collected in nature and on females that had been taken biting persons infected with *Onchocerca volvulus*. Development of the *Onchocerca* larvae had no direct influence on the developmental cycle of the ovaries. Both types of females needed only one blood-meal to mature their eggs, but engorgement had to be complete. An inadequate meal (less than 0·8–1 mg.) was the usual cause of interruption of the ovarian cycle. Each cycle occupied four days. Oviposition

took place 5–9 days after a blood-meal, the number of eggs laid being generally 250–280. A female that has engorged on a host infected with *O. volvulus* can infect another host bitten after oviposition (6 days after the infecting meal). In unfed females, the follicles developed to some extent during the first and second days after emergence at the expense of reserves built up in the larval stage, but after this, development ceased and the female normally died on the fourth day. Sugar solution did not prolong life but an inadequate blood-meal did.

The function of the crop is discussed. Ingested sugar solution and fruit juices passed into it, but blood did not. From a study of the fluid from the crop, which produced in man the same reactions as the insect's saliva, it is concluded that the crop is a reservoir for saliva. The process of digestion of blood and also the female reproductive system and ovarian development are described. The fact that each ovariole has three follicles suggests that three gonotrophic cycles can be completed, but there is no evidence of this. Only two are known to be completed in nature, and it appears that the females normally live only about a fortnight. The physiological age of females cannot be deduced from any qualitative or quantitative character.

NETTEL F., R. Estudio comparativo de las capturas de simúlidos en personas y animales (equinos), en el foco de oncocercosis de Chiapas. [**Comparative Study of the Captures of *Simulium* on Man and Animals (Horses) in the Focus of Onchocerciasis in Chiapas**] *Medicina.* Mexico. 1952, Feb. 25, v. 32, No. 646, 73–80. [23 refs.] English summary.

In 40 localities of Mexico collections of adult *Simulium* biting man and animals (horse and mule) were made for one hour each morning ; 5,472 females were taken on man and 2,967 on animals. Twenty-one species of *Simulium* occurred in the catches. *S. ochraceum* was found feeding only on man and *S. metallicum, S. callidum, S. exiguum* and *S. haematopotum* on both man and horse ; the remaining species were taken only on horses. *S. metallicum* and *S. haematopotum* form by far the greatest part of the catches. No definite conclusions on the relationship of these species to onchocerciasis in man are presented.

D. S. Bertram

ADAMS, J. C. L. & WOODRUFF, A. W. **Diethylcarbamazine in the Treatment of Onchocerciasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, Jan., v. 47, No. 1, 66–9.

Eleven European patients with onchocerciasis were treated in London with diethylcarbamazine (hetrazan, banocide). In 8 cases, microfilariae were found in the skin ; in all 11 there was pruritus and dermatitis especially in the buttock region ; in one the eyes were affected ; in 3 subcutaneous nodules were present. Eosinophilia ranged from 8 to 70 per cent. (mean, 30 per cent.). In 7 cases the complement-fixation test to filarial antigen was positive and in 4 it was negative. In 6 out of 7 cases the skin test was positive.

The standard course of treatment was 2 mgm. drug [presumably citrate, not base] per kgm. thrice daily for 7 days followed by 3 mgm. per kgm. thrice daily for 14 days. Within a few hours of the first dose the pruritus always increased. One patient developed widespread oedema and erythema of trunk and arms ; another conjunctivitis and oedema of the eyelids and left arm. The total eosinophile count also rose ; in one case it was as high as 68 per cent. of 20,000 leucocytes per cmm. Several doses of cortisone were given to one patient to diminish these allergic reactions and they may have had a slight effect.

In only 2 of the 11 patients was there definite clinical improvement, and in these it lasted at least 6 or 12 weeks respectively : both were mild cases. In the others the pruritus and skin condition persisted or returned soon after the end of treatment. In one patient a nodule was excised 2 days after the end of treatment, and it contained living worms. In a single patient having corneal opacities, these disappeared following treatment. It is concluded that diethylcarbamazine may temporarily alleviate the skin symptoms in onchocerciasis but does not eradicate the infection. *F. Hawking*

DEFICIENCY DISEASES

Helweg-Larsen, P., Hoffmeyer, H., Kieler, J., Thaysen, E. H., Thaysen, J. H., Thygesen, P. & Wulff, M. H. **Famine Disease in German Concentration Camps : Complications and Sequels with special reference to Tuberculosis, Mental Disorders and Social Consequences.** *Acta Med. Scandinavica.* 1952, v. 144, Suppl. 274, 460 pp., 25 figs., 1 map & 2 diagrams. [484 refs.]

The Germans deported some 6,000 Danes to concentration camps in Germany. Most of these were members of either the Resistance Movement or the Police Force. The first part of this report is an attempt by 4 doctors who were themselves deported " to express some of this human misery in medical terms and figures—to provide a medical contribution to the historical assessment of the German concentration camps. They were founded on the principle of biological extermination, and therefore morbidity and mortality must be necessary indicators to their proper assessment." " Without taking direct murder into account, the average duration of survival in these camps was little over six months." In this report the clinical account of famine diseases is based entirely on personal experience and observation. Although a reader, familiar with the famine literature that has appeared as a result of World War II, will find little that has not been already described, there is nothing second hand about this book. The horrors, that result from a policy of extermination through starvation, are set out with a wealth of vividness and detail. The very pages of the paper seem to have taken up the stench of famine diarrhoea. Assuredly there is here one of the classics of medical literature that will be read by students as long as our libraries survive. Nowhere else can be found the clinical features of starvation so succinctly and brilliantly described.

The second half of the book is a statistical investigation of a follow-up of 1,282 members of the Resistance Movement and the Police Force after their return home on liberation. Special attention is paid to problems of pulmonary tuberculosis, psychological symptoms and social readjustments. Strong evidence is presented that, in addition to the appalling hygienic conditions, the low calorie intake predisposed the men to tuberculosis. Psychological and social rehabilitation was often slow. Restlessness was common and, associated with an inability to concentrate, retarded the return to normal human relationships both in the home and at work. The dissatisfaction that the active members of the Resistance Movement felt at subsequent political and social developments was probably an important contributory factor. *R. Passmore*

Ferro-Luzzi, G. & Salzmann, S. **Outline of Nutritional Status of Eritrea.** Extract from *Atti I. Congr. Internaz. Estafricano, Asmara, 30 mar.-5 apr. 1952.* 39 pp., 6 figs. on 6 pls. [36 refs.]

This report attempts to summarize the nutritional status of the people of Eritrea under 4 heads, the clinical evidence for the presence of nutritional diseases, the results of dietary surveys, the chemical analyses of Eritrean foods and an assessment of agricultural productivity. The unsettled state of the country, a lack of trained staff and a lack of equipment have prevented the authors from investigating these problems systematically. Many of the data presented are meagre and do not permit of general conclusions. However, what has been done has made clear that not a few Eritreans fail to obtain a diet adequate in quantity or quality and that hunger and deficiency diseases are both common in parts of the country. [It is to be hoped that the authors will be in a position to obtain more systematic information in the future. This brief report ought to be disturbing.] *R. Passmore*

See also p. 580, Rhodesia, Southern. Dept. of Health, **Annual Report of the Nutrition Council for 1952.**

le Riche, H., Kinnear, A. A., Loewenthal, L. J. A., Boshoff, P. H. & Smit, R. J. **The Diepkloof Nutrition and Health Study on Bantu Boys, South Africa. Final Evaluation and Conclusions.** *South African Med. J.* 1953, Jan. 31, v. 27, No. 5, 103–9. [10 refs.]

An abstract of the paper describing the general features of this study has already appeared [this *Bulletin*, 1952, v. 49, 714]. Thirty of the Bantu boys subsisted for a year on a good standard diet (calories 3,480, animal protein 46·4 gm. per day) and 30 on a typical poor Bantu diet (calories 2,963, animal protein 4·1 gm. per day). The groups put on 11·9 lb. and 9·4 lb. of weight on an average in the year. Details of the biochemical and clinical methods of the assessment of nutritional status are along familiar lines. For the most part they re-emphasize the extraordinary difficulties of these methods, even in the hands of experts. The really striking finding is the result of the physical fitness tests carried out by means of the Harvard step test with an 18-inch platform. The full figures are :—

Harvard Step Test Scores : 53 Diepkloof Bantu Boys, and 600 American Private School Boys

	Per cent. in Each Category	
	Bantu	American
Score of 50 or less : Very poor physical condition	0	1·5
Score of 51–60 : Poor physical condition ...	0	18
Score of 61–70 : Fair physical condition ...	13	50
Score of 71–80 : Good physical condition ...	38	25
Score of 81–90 : Excellent physical condition ...	24·5	4
Score of 91 or more : Superior physical condition ...	24·5	1

Clearly there was nothing wrong with either heart or lung in these Bantu boys. But the questions naturally arise : are the Harvard step test standards sound ? Are well-fed American boys fat and flabby ?

R. Passmore

BANERJEE, B. **Nutritional Level of Students and Nurses of Assam Medical College during the Winter Season, 1950–51.** *J. Applied Physiol.* 1953, Feb., v. 5, No. 8, 432–6, 1 fig. [11 refs.]

" A nutritional survey of the three hostels of Assam Medical College was undertaken in January 1951. It was found that the male and female students received a satisfactory quota of calories, proteins, CHO, fat, nicotinic acid and ascorbic acid. Vitamins A, B_1 and B_2 and total iron were lower than accepted standards but this did not produce any clinical deficiency syndrome. The diet of the nurses, however, was found to be deficient in every respect.

" The actual calorie supply and the goal are discussed, and also the quality of protein, the vitamin A, B_1 and B_2 intake, the total and available iron content and the supply of total iron."

BURGESS, R. C. & LAIDIN BIN ALANG MUSA. **A Report on the State of Health, the Diet and the Economic Conditions of Groups of People in the Lower Income Levels in Malaya.** *Rept. Inst. Med. Res., Fed. Malaya* No. 13. 1950, Sept., 80 pp., 4 figs. & 9 pls. [35 refs.]

Three groups, each containing 37 to 50 families, were studied. The first were Malay smallholders, the second Malay fishermen and the third Indian labourers on a rubber estate. The report presents again the familiar picture in South East Asia of an insufficiency of land, low levels of human productivity, indebtedness, a diet inadequate in both quantity and quality and a subsequent low level of general health. These features are set out with remarkable clearness. Inevitably much of this (and similar reports) is of only local interest ; but for anyone concerned in the future welfare of the people of Malaya, the clear description of the details of present-day rural life must become obligatory reading.

For the general nutritionist some points of special interest arise. Angular stomatitis and a mild cheilosis were found in groups who appeared to be consuming a sufficiency of riboflavin ; it is suggested that a simple deficiency of riboflavin alone cannot be responsible for the appearance of these conditions. The complexity of the problems of tropical anaemias is also emphasized. The men for the most part had satisfactory haemoglobin levels, but many of the women were anaemic, some severely so. There was no malarial infection and, although intestinal worms were harboured by almost all, there was no association between the load of worms and the degree of anaemia. Anaemia in Malay women is not essentially the result of either hookworm or malaria. A table of the recorded hours of daily physical activity (3·3 hours for the smallholders, 4·0 for the fishermen and 7·5 for the plantation labourers) is an interesting new departure in these studies. The more active labourers consumed 300 calories a day more than the other two groups. More detailed studies of the physical work actually carried out in relation to food intake and health might be profitable.

Finally there is a repeated emphasis on the need for health education and instruction in mothercraft. Many ingrained food habits of the people run counter to all modern physiological teaching. The public health nurse is one of the most important technicians needed to teach the Malays how to raise themselves out of their present cycle of ill health. *R. Passmore*

NICOL, B. M. **Protein in the Diet of the Isoko Tribe of the Niger Delta.** *Proc. Nutrition Soc.* 1953, v. 12, No. 1, 66–9.

The Isoko gets his animal proteins from fish, monkeys, goats, porcupines, cane rats, Gambian rats, African snails, dried frogs, palm weevils, snakes and lizards. The ingenuity with which this varied diet is obtained is well described. On high days and holidays it is washed down by copious draughts of palm wine which "induces the stimulation, followed by sedation, that the Isoko consider essential to full enjoyment of a life pursued under anxious circumstances". *R. Passmore*

BRAY, Barbara. **Nitrogen Metabolism in West African Children.** *Brit. J. Nutrition.* 1953, v. 7, Nos. 1/2, 3–13. [27 refs.]

Nitrogen balances are recorded on 8 African boys aged 7–10 years and weighing 16–24 kgm. The children were heavily infected with hookworms and round worms and most carried malaria parasites. Liver biopsies were made on 7 of the boys, and in 4 of these some degree of fibrosis was found. On each child 3–6 balances were made, each lasting 3 days, over periods from 50 to 117 days. During this time the children lived in hospital on a mixed cereal and meat diet yielding an average daily intake of 1310 Cal. and 52 gm. of protein. On this diet the children appeared to retain 0·1 to 3·3 (average 1·6) gm. of nitrogen daily. Despite these large positive balances, none of the children put on weight. No. 8 for example, with an average nitrogen retention of 3·3 gm. per day, equivalent to nearly 2 kgm. of protein over 84 days, actually lost weight over this period. The author offers no satisfactory explanation of this anomaly. [It could be explained away, if, in fact, the urine was not completely collected. The accurate collection of urine from small active African boys over a 72-hour period must be a difficult technical task. There is no description of the precautions taken to see that it was properly carried out.] *R. Passmore*

JACKSON, J. H. **Malnutrition in the Native Child.** *South African Med. J.* 1953, Feb. 14, v. 27, No. 7, 136–40. [25 refs.]

The author, who writes with 5 years of experience in general practice in East Pondoland, suggests that the full clinical picture of kwashiorkor and infant pellagra as seen in an African child is developed by the summation of the effects of malnutrition from generation to generation. "The womb which bore it and the breast which awaits it is deficient in the essentials for its existence. Insult is added to injury when it is weaned on to mealie pap, and the process begun in the womb proceeds to its final result, malignant malnutrition." The practical conclusions drawn are "the prevention is better than cure . . . . and an attack on the pregnant woman, nursing mother and the new-born infant gives results which are more than gratifying". *R. Passmore*

DEAN, R. F. A. & SCHWARTZ, Ruth. **The Serum Chemistry in Uncomplicated Kwashiorkor.** *Brit. J. Nutrition.* 1953, v. 7, Nos. 1/2, 131–47, 10 figs. [58 refs.]

This paper is part of an attempt to define kwashiorkor in biochemical terms. In the acute state of the disease total serum proteins were reduced, chiefly because the level of albumin was low. Serum enzymes, such as amylase and esterase, were also present in low concentrations. Levels of blood cholesterol and urea were also very low. Treatment with large amounts of milk protein rapidly altered the blood in the direction of normality. All the data presented

here confirm the theory that a lack of protein is responsible for the disease. [The general discussion of the findings obtained in this study and of those recorded by others is a valuable contribution to our knowledge of the disease.]
R. Passmore

LAMBRECHT, A. & HOLEMANS, K. Valeur pronostique de la ponction médullaire dans le Mbuaki (malnutrition maligne). [**The Prognostic Value of Sternal Puncture in Mbuaki (Malignant Malnutrition)**] *Ann. Soc. Belge de Med. Trop.* 1952, Dec. 31, v. 32, No. 6, 657–64. [12 refs.]

Differential cell counts were made on sternal puncture material from 7 African children without and 24 with malignant malnutrition (described as identical with kwashiorkor). As an expression of cellular activity the ratio granulocytes/erythroblasts (Gr/Er) was determined. In the normal marrows this was 1·45. In the marrows from patients with malignant malnutrition 13 gave a ratio above 4·0, 12 of whom either died or got worse. This ratio is considered to have a prognostic value superior to that of the clinical findings. *R. Passmore*

LEONG, P. C. & STRAHAN, J. H. **Thiamin Loss due to Washing and Cooking of Enriched Rice.** *Med. J. Malaya.* 1952, Sept., v. 7, No. 1, 39–47, 1 fig.

A study was made of the loss of thiamine from rice during cooking under institutional conditions. The loss of thiamine in washing polished rices ranged from 38 to 70 per cent. in eight experiments with a mean loss of 54 per cent. These rices were enriched by adding " Roche-mix ", a commercial preparation fortified to contain 400 mgm. thiamine, 200 mgm. riboflavin and 2,400 mgm. niacin per pound, in the proportion of 1 part of " Roche-mix " to 200 parts of polished rice. Of the total thiamine in these enriched rices, nearly 80 per cent. remained after washing and cooking. *R. Passmore*

See also p. 559, FALCONE, Ariboflavinosi oculare ai tropici. [**Ariboflavinosis of the Eye in the Tropics**]

HAEMATOLOGY

ITANO, H. A. **Human Hemoglobin.** *Science.* 1953, Jan. 30, v. 117, 89–94. [44 refs.]

SPAET, T. H. **Identification of Abnormal Hemoglobins by means of Paper Electrophoresis.** *J. Lab. & Clin. Med.* 1953, Jan., v. 41, No. 1, 161–5, 2 figs. [15 refs.]

" By means of paper electrophoresis a simple and economical method is available for the identification of certain abnormal hemoglobins. Examples are presented of ' a,' ' b,' and ' c ' hemoglobins in various combinations."

SINGER, K. & FISHER, B. **Studies on Abnormal Hemoglobins. VI. Electrophoretic Demonstration of Type S (Sickle Cell) Hemoglobin in Erythrocytes Incapable of showing the Sickle Cell Phenomenon.** *Blood.* 1953, Mar., v. 8, No. 3, 270–75, 2 figs. [19 refs.]

" 1. A family is reported in which 2 children have unmistakable sickle cell anemia, but the mother's red cells do not sickle ; the father and a third

child exhibit the typical sickle cell trait. Electrophoretic studies of the hemoglobin solution prepared from the mother's erythrocytes demonstrated, however, the presence of a small amount (5 per cent) of type S hemoglobin. This abnormal component was identified by its mobility and by addition experiments.

"2. The finding that the mother's erythrocytes contain small quantities of S hemoglobin, but are incapable of sickling, confirms the genetic concept that sickle cell anemia will only develop when both parents transmit the gene for S hemoglobin.

"3. The physico-chemical and possible medico-legal aspects of the fact, that S hemoglobin is sometimes only detectable by means of electrophoresis are discussed."

GRIFFITHS, S. B. **Absence of the Sickle Cell Trait in the Bushmen of South-West Africa.** [Correspondence.] *Nature.* 1953, Mar. 28, v. 171, 577–8.

The author examined the blood of 118 Bushmen of South-West Africa and failed to detect the sickle-cell trait in any. The ethnological importance of this finding, in contrast with the high incidence of the trait in other parts of Africa, will be discussed in a report of a general survey, of which this study formed a part.

GALLAIS, P., CARDAIRE, G., PLANQUES, L., PRUVOST, A., CROS, R. & NABHOLTZ, M. Les manifestations neuro-psychiques de la sicklémie. À propos d'une forme mentale chez un Noir. (Première observation neuro-psychique française). [**The Neuro-Psychiatric Manifestations of Sicklaemia : a Mental Form in a Negro. (The First French Neuro-Psychiatric Observation)**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 1, 103–12, 1 fig. [16 refs.]

The reported percentage of persons with sicklaemia who show any complications varies according to different authors but is usually considered to be about 5 per cent. Nervous complications are not infrequent and these may include coma and sudden death. On the contrary, mental conditions are very rarely noted. However, GROVER (*Ann. Intern. Med.*, 1947, v. 26, 843) in a series of 48 cases put down 7 as mentally defective, of which 3 were inpatients in psychiatric institutions.

It would appear that neuro-psychiatric conditions are not as rare in the sicklaemic as one might imagine.

A case is reported. An African soldier from Dahomey was admitted with a history of strange episodes in his behaviour for a year. He was habitually listless and sleepy, a condition suggesting trypanosomiasis, but had attacks of unjustifiable anger and aggressiveness. At other times he was found flat on the ground clawing the earth and muttering unintelligible words. Between these attacks his behaviour was normal for several weeks or months.

He had been in hospital in Hanoi, Vietnam, without a conclusive diagnosis and had been repatriated.

At the time of his admission he was calm and practically normal in behaviour but laughed without reason.

The examination of the nervous system and X-ray examination showed nothing abnormal. Examination of other systems were similarly negative except that there was a slightly raised blood pressure, slight anaemia, 100 per cent. sickling of red cells in 24 hours (by the technique of Emmel), 2 mgm. bilirubinaemia, positive Wassermann and Kahn reactions, and ancylostoma ova in the stools.

During his stay in hospital the sickling showed variations grossly parallel to his mental state.

After a period of normal behaviour of about 2 months he had a maniacal attack which lasted about a week, after which he was again quiet and comparatively normal.

The case can be summarized thus :—

In a man who was rather feeble mentally and a sexual invert there were superimposed psychotic periods of variable duration which coincided with sicklaemic crises.

In the discussion the authors refer to the work of WERTHAM, MITCHELL and ANGRIST (*Arch. Neurol. & Psychiat.*, 1942, v. 47, 752) who reported 5 similar cases, in 4 of which the diagnosis was made post mortem.

The acute visceral manifestations in sickle-cell disease are caused by local sickling and haemolysis, but those in the nervous system are not so clear. Essentially, there are diffuse vascular lesions, hyperaemia and congestion, determined by minute foci of necrosis with a predilection for the cortical zones and the juxta-cortical white substance.

From the biochemical point of view the authors consider that sicklaemia and the haemolytic crises depend on an inborn error of lipoid metabolism ; the lipoid coating of the red cells controls the superficial tension of the red cells and the amount of oxygen that reaches the haemoglobin.

L. E. Napier

ELYAN, H. & RIMINGTON, R. A. **A Case of Cooley's Anaemia in Queensland.** *Med. J. Australia.* 1953, Jan. 31, v. 1, No. 5, 145–6, 2 figs. (1 on pl.)

"A case of Mediterranean anaemia occurring in Queensland is reported, with haematological and radiological investigation." [The child affected was of Cypriot parentage.]

ARMINANTE, J. C. Eliptocitose. Estudo de um caso e verificação de outro em uma mesma família. [**Familial Elliptocytosis**] *Hospital.* Rio de Janeiro. 1952, Sept., v. 42, No. 3, 435–44, 3 figs. [10 refs.]

The English summary appended to the paper is as follows :—

"The author reports a case of familial elliptocytosis ; another similar case was found after haematologic study of members of the same family. Difficulty of diagnosis in mild cases is emphasized and the association with other familial erythropoietic anomalies is discussed."

VON BONSDORFF, B. & GORDIN, R. **Treatment of Pernicious Anemia with Intramuscular Injections of Tapeworm Extracts.** *Diphyllobothrium latum* **and Pernicious Anemia XIV.** *Acta Med. Scandinavica.* 1953, Jan. 30, v. 144, No. 4, 263–7, 5 figs.

The authors [this *Bulletin*, 1953, v. 50, 44] showed that dried *Diphyllobothrium latum* given by the mouth produced remission of pernicious anaemia "under the same conditions as" vitamin B_{12} ; and NYBERG [see above, 1953, p. 534] showed that the growth of *Lactobacillus leichmannii* is strongly stimulated by extract of *D. latum*. The authors claim that these results indicate that the living *D. latum* contains large quantities of vitamin B_{12} of which the host is presumably deprived, and under certain conditions "this evidently results in the development of pernicious anaemia".

In this paper the authors record results of the intramuscular administration of two different aqueous extracts of *D. latum* to 5 patients suffering from pernicious anaemia, 4 of whom were carriers of *D. latum*. Case-histories of the

5 patients are given, together with details of the method of preparation of the extracts of *D. latum* and of the estimation of their content of vitamin B_{12}. Doses of 2 to 10 ml. of these extracts were given intramuscularly and the patients were kept on a meat-free diet. Both extracts had a very strong anti-anaemic effect in all the experiments. Three patients were more closely studied. They showed an increase on the number of thrombocytes, a stimulation of leucopoiesis with a marked shift to the left and reticulocytosis with improvement of the haemoglobin and erythrocyte values. There was a marked release of nucleated red blood cells, but no significant change in the eosinophile count. No toxic, allergic or other untoward reactions occurred.

G. Lapage

VENOMS AND ANTIVENENES

Haas, G. **On the Present State of our Knowledge of the Herpetofauna of Palestine.** *Bull. Res. Counc. of Israel.* 1951, Aug., v. 1, No. 3, 67–95. [22 refs.]

Baz, I. I. *Glauconia cairi* **from the Stomach of a Child.** *J. Roy. Egyptian Med. Ass.* 1953, v. 36, No. 1, 47–9, 4 figs.

An Egyptian child of 4 years awoke one night with symptoms suggesting food poisoning : in the vomit was found a living snake, 8·7 cm. × 1·5 mm. The snake is described and illustrated. It was identified as *Glauconia cairi*, which occurs in freshly watered gardens and the edges of canal banks : it is also found under stones or on the floors of huts built in cultivated land. The snake may reach some 20 cm. in length.

It is suggested that the child may have swallowed the snake while drinking water from a broken clay pot shortly before the attack.

H. J. O'D. Burke-Gaffney

Jutzy, D. A., Biber, S. H., Elton, N. W. & Lowry, E. C. **A Clinical and Pathological Analysis of Snake Bites on the Panama Canal Zone.** *Amer J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 129–41, 5 charts. [19 refs.]

During the 27 years 1925–1951 inclusive 55 cases of snake-bite have been recorded at the Gorgas Hospital, Ancon ; 7 of the patients died. The accident is, therefore, not very common ; the *fer de lance* (*Bothrops atrox*) is the commonest cause, but other *Bothrops*, *B. lansbergii* (hog-nosed viper) and *B. schlegelii* (palm viper) have been identified in Panama, and the Coral snake (*Micrurus*) and the Bushmaster (*Lachesis muta*). The snakes were identified in 19 cases and in 18 the snake was venomous, though in 6 of the patients there was no clinical evidence of actual poisoning ; in 36 cases the snake was not identified and only 11 of the patients gave evidence of poisoning. In other words, in 23 cases there was clear evidence of poisoning, none in 32 cases. Seven of the 23 died and the autopsy findings are detailed in a table. Extensive haemorrhages were found in all and of the central nervous system in 3. Details are given of a coloured woman, 34 years of age, bitten on the left ankle (snake not identified) in whom the symptoms were so severe that, in spite of antivenin treatment, the leg had to be amputated above the knee ; after this recovery was uneventful.

Treatment is summed up in : use of a tourniquet to obstruct venous and lymphatic flow, but not arterial ; suction ; incision over the fang marks and subcutaneously around the edge of the swelling, and polyvalent *Bothrops*

antivenin. Of the antivenins available 10 cc. neutralized about 15 mgm. of the *Bothrops* venom, so large doses are needed, for the snake may inject as much as 160 mgm. of venom. As the actual amount is not known, the contents of one ampoule should be injected every hour for 4 hours and then, if symptoms persist, one ampoule every 4 hours for 1–2 days, or, if only the oedema remains, one ampoule every 12 hours for the same period. *H. Harold Scott*

Mohammed, A. H. & El Karemi, M. **An Antidote to Scorpion Toxin.** *J. Trop Med. & Hyg.* 1953, Mar., v. 56, No. 3, 58–9.

The senior author, with Hassan, showed that certain paralysants of the sympathetic and parasympathetic nerves, such as ergotoxin and atropine, antagonized scorpion toxin, which had already been shown to be a powerful stimulant of the autonomic system (*Lancet*, 1940, v. i, 1001). Later, Mohammed replaced ergotoxin by ergotamine tartrate (" Femergin ", Sandoz) and atropine by " Bellafoline ", Sandoz (*ibid.*, 1942, v. ii, 364).

In the present study, " Femergin " was itself replaced by an ergot preparation of more constant qualities, namely dihydro-ergotamine methane-sulphonate (DHE-45). It was found that a combination of 0·1 mgm. of this preparation and 0·5 mgm. of " Bellafoline " injected into albino rats of 200 mgm. simultaneously with scorpion toxin saved rats even when the toxin was as much as three times the MLD. Furthermore, when 3 groups of 3 such rats each received a subcutaneous injection of 0·12 mgm. of scorpion toxin having an MLD of 0·1 mgm. they could all be saved when the above doses of the combined antidotes were given as late as 30, 60 and 90 minutes, respectively, after the toxin. It is suggested that this procedure might be employed in conjunction with specific antiserum in the treatment of scorpion sting in man.

H. J. O'D. Burke-Gaffney

Stahnke, H. L. **The L-C Treatment of Venomous Bites or Stings.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 142–3.

In Arizona the author finds that during a period of 20 years the scorpions, *Centruroides sculpturatus* and *C. gertschi* were responsible for " more than twice as many deaths as all other venomous animals put together, including rattlesnakes, black widow spiders, Gila monsters, and venomous insects ". [See this *Bulletin*, 1950, v. 47, 656.]

The author finds what he calls " cut and suction " treatment unsatisfactory, and has substituted " ligature and cryotherapy ", L-C (ligature and cold). The principles involved are these : venom action is chemical and in every 10°C. fall in temperature the chemical action is halved. Iced water locally applied will reduce the temperature from 37° to 4–7°C., thus reducing the local chemical activity almost to nil. If any organisms have been introduced the reduction of temperature by 30°C. prevents their multiplication. In practice a ligature is applied *at once* as near the site of the bite as possible, a string or shoe-lace to a finger, for example, and a piece of ice while a vessel of crushed ice and water is being got ready. The hand is then placed in the iced water and after 5 minutes the ligature is removed but the hand is kept in the iced water for 2 hours at least. This is for either of the scorpion stings ; for the Gila monster 6–7 hours, for rattlesnake or pit viper up to as much as 20 hours. The patient must be kept warm except for the frozen part. If the trunk is bitten an ice-pack should replace the ice-bath ; if no ice is available ethyl chloride spray is to be used, but not enough to freeze the tissue, only " to the point of frost formation " and when this disappears repeat.

Anyone going into a snake area should carry with him tubes of ethyl chloride. The action of the procedure is explained as follows : the ligature keeps the venom localized so that it enters the body very slowly and too dilute to cause harmful effects. The cold is also anaesthetic. The author claims that by this method there is ample time to obtain antivenin, but " death can be prevented with the L-C treatment alone if sufficient time is given for its use ".

H. Harold Scott

HALSTEAD, B. W. & BUNKER, N. C. **Stingray Attacks and their Treatment.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 115–28, 12 figs. [22 refs.]

There are two families of sting-ray, the stingray proper, Dasyatidae, and the eagle-rays or bat-rays, Myliobatidae. They rest, partially or completely buried in the upper layers of the mud of shallow bays and estuaries of warm waters, and stinging results from the unwary wader treading on them. The wader should shuffle his feet when in such waters, for this frightens the fish from cover. The authors in this paper give sketches of 4 types of caudal appendages. The question of a venom apparatus has been the subject of debate, but it has now been shown that such is definitely present and the poison is inserted in the wound produced by the penetration of the serrated spine with recurved teeth and is mainly produced by modified epithelial cells. Tests carried out by VELLARD in 1931–32 on laboratory animals showed the venom to be fatal to mice in 10–20 minutes and also, on occasion, to dogs. Owing to the backward arrangement of the serration penetration is easy, but withdrawal lacerates the tissues, thus furthering absorption and distribution of the poison.

Symptoms may be severe, as the following recorded case shows : a man, 24 years of age, stepped on a Californian bat-ray, *Holorhinus californicus*, which struck him on the right foot. Pain was intense and immediate, bleeding was profuse, numbness succeeded and he was unable to talk, and after hopping on one leg for about 20 yards he lost consciousness and fell in the water. A companion dragged him to the shore ; he regained consciousness but soon collapsed again. The site of the wound was swollen and cyanotic and his companion lanced it with a razor-blade ; the pain returned and became more intense but was eased by local heat. Soreness and cellulitis remained and the patient entered hospital about a week after infliction of the injury, with lymphangitis and brawny oedema ; necrotic tissue was cut away. He had previously had tetanus antitoxin and penicillin ; the latter was continued (100,000 units twice daily after 6 similar doses every 4 hours) and supplemented by streptomycin in 1 gm. doses twice daily. In another week the wound was healing, but there was still tingling and some degree of numbness of the toes. Another case, due to the spotted eagle-ray, *Aëtobatus narinari*, is also briefly described.

Treatment is summed up in early incision to encourage bleeding, and suction, irrigation with 0·01 per cent. potassium permanganate solution and, if the wound is large, drainage for a day or two, and fomentations. Soaking in hot $MgSO_4$ solution is also a help. Treatment otherwise is mainly symptomatic, such as local infiltration with 0·5–2·0 per cent. procaine, opiates or barbiturates, cardiac stimulants and, as a guard against complications, tetanus antitoxin and antibiotics.

H. Harold Scott

DERMATOLOGY AND FUNGUS DISEASES

WILSON, H. & THACKRAY, A. C. **Sweat Ducts and the Pompholyx Vesicle.** Reprinted from *Brit. J. Dermat.* 1952, Nov., v. 64, No. 11, 402–7, 4 figs. [13 refs.]

From a series of 7 patients with pompholyx whose skin was subjected to biopsy and examined microscopically the authors present clear evidence that the lesion originates among the prickle cells as an accumulation of fluid, which then expands to form a typical eczematous vesicle. The vesicle does not result from sweat retention although sweat ducts may occasionally open into it ; where this is found it has resulted from breakdown of the walls of ducts which originally passed through, or near to, the vesicle. The paper includes 4 excellent photomicrographs. *M. L. Thomson*

D'AVANZO, G. La dermatite da contatto provocata da farfalle del Genere Hylesia. (" Yellowtail Moth Dermatitis " o " Caripito Itch ".) [**Yellowtail Moth Dermatitis or Caripito Itch**] *Med. d. Lavoro.* 1952, Dec., v. 43, No. 12, 439–52, 5 figs. [17 refs.] English summary (9 lines).

The yellowtail moth belongs to the genus *Hylesia.* Caripito is a Venezuelan oil-shipping port ; it is situated on the St. Juan River to south west of Trinidad. Tankers sail up this river for 50 miles or more, between banks of tropical growth infested with these Lepidoptera. The dermatitis is due to tiny needle-like hairs which the moths, which are attracted by the ship's lights, shed off their abdomen. These sharp hairs contain an irritant substance inside a central cavity which runs through their length. The irritant is accidentally inoculated into the skin by these hairs and gives rise to an acute itching dermatitis which spreads from the point of contact to whole regions of the body, *e.g.*, arm, chest, etc. The affected person may be left in an allergic condition which lasts for several years. The moths appear in spring and summer.

The hairs stick to all sorts of articles and may affect crew who have been engaged later and elsewhere and have never come near the yellowtail moth.

Synthetic detergents of the sulphonated oil type are preferable to soap for washing the body to get rid of yellowtail moth hairs after exposure to the risk. Sodium thiosulphate is recommended for desensitization but some recurrent cases may require more specific treatment against the allergy. Suspensions such as calamine are to be preferred to fatty preparations for local application.

[The paper is a very well set-out monograph on the subject and should prove useful to ship surgeons, masters and others who have a practical interest in this " occupational " affection. See also this *Bulletin*, 1951, v. 48, 835.] *J. Cauchi*

See also abstract on Mal del Pinto (VARELA, GONZÁLEZ RIVERA & BARRIGA VÁZQUEZ, Algunos datos epidemiológicos y estadísticos del mal del pinto. [**Some Epidemiological and Statistical Data of Mal del Pinto, based on 460 Clinical Cases**]), in the section on Yaws and Other Treponematoses, above, 1953, p. 517.

DYKES, J., SEGESMAN, J. K. & BIRSNER, J. W. **Coccidioidomycosis of Bone in Children.** *Amer. J. Dis. Children.* 1953, Jan., v. 85, No. 1, 34–42, 7 figs.

Coccidioidomycosis of bone in children is not uncommon in the endemic areas of the disease, but hitherto little has been published on this subject. The

authors have compiled a list of 26 cases from the records of the Kern General Hospital, San Joaquin Valley. The first 5 of these 26 cases occurred in the period 1909 to 1930 and few data on them are available, but in 4 the osseous lesions were in the small bones of the extremities only and in the fifth the skull and the vertebrae were also involved ; in 4 of the children the disease was fatal. The remaining 21 cases occurred during the period 1930 to 1950, and the available data on these are set out in tabular form. The ages of the children were from 5 months to 13 years, 4 being under 12 months old. With the exception of two white children and a Filipino, all were either Mexicans or Negroes and both sexes were equally affected. In many cases (probably in all) the disease of bone was preceded by or coincident with disease of the lungs.

In osseous coccidioidomycosis of children, one bone or several may be affected, and those most frequently involved were the phalanges of the hands and feet, the flat bones of the skull and the facial bones, the vertebrae, the bones of the tarsus particularly the *os calcis*, the ribs and the long bones of the arm and leg. The common type of lesion was osteolytic and it was frequently associated with abscess-formation. However, in only two of the children were the clinical symptoms severe, and in some cases the disease was only discovered during a routine radiological examination.

It is a chronic disease but, unless it is associated with involvement of other systems, the prognosis for ultimate recovery is good.

A case not included in the 26 was that of a man who at the age of 12 had suffered from coccidioidomycosis of the ankle. After remaining asymptomatic for 18 years, during which he served with the armed forces, the ankle became swollen and painful, and material obtained from two osteolytic foci yielded *Coccidioides immitis*. Another remarkable case was that of an infant who was born during a dust storm and, apparently, infected at birth. Coccidioidal pneumonia developed at the age of 2 weeks and the first osseous lesion appeared at 4 weeks.

J. T. Duncan

See also p. 535, VANBREUSEGHEM & WANSON, Echinococcose primitive intra-épidermique et chromoblastomycose en lésions associées. [**Intra-Epidermal Primitive Echinococcal Infection and Chromoblastomycosis in Associated Lesions**]

CURTIS, A. C. & HARRELL, E. R., Jr. **Use of Two Stilbene Derivatives (Diethylstilbestrol and Stilbamidine) in Treatment of Blastomycosis.** *Arch. Dermat. & Syph.* 1952, Dec., v. 66, No. 6, 676–88, 10 figs. [Refs. in footnotes.]

" Two men with cutaneous blastomycosis treated with 3 mg. of diethylstilbestrol daily had complete disappearance of their lesions in three to four months.

" Two patients with systemic blastomycosis had rapid improvement of their disease after 3·0 gm. and 7·2 gm. respectively of stilbamidine. The first patient with pulmonary, lymph node, and skin lesions has remained well and culturally negative for four months after treatment. The second patient with pulmonary, lymph node, and bone lesions has had two mild cutaneous relapses but has remained culturally negative and asymptomatic from the pulmonary disease and has shown continued bone healing.

" The fungistatic effect of diethylstilbestrol and stilbamidine in vitro is reported on Blastomyces dermatitidis.

" The stilbene compounds offer an entirely new approach to the treatment of blastomycosis."

Conway, H. & Berkeley, W. **Chromoblastomycosis (Mycetoma Form) treated by Surgical Excision. Correction of Defect by Cross Leg Pedicled Flap.** *Arch. Dermat. & Syph.* 1952, Dec., v. 66, No. 6, 695–702, 3 figs. [Refs. in footnotes.]

TROPICAL OPHTHALMOLOGY

Falcone, G. Ariboflavinosi oculare ai tropici. [**Ariboflavinosis of the Eye in the Tropics**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, Nov., v. 33, No. 11, 619–33. [25 refs.] English summary.

The author of this paper is in charge of the Ophthalmic Department of the Civil Hospital at Mogadishu, Somaliland. He critically reviews a wide literature on the subject and refers to Yudkin's postulates for the diagnosis of a deficiency disease, namely, (*a*) evidence of diet deficiency, (*b*) clinical signs and symptoms which are characteristic of that deficiency, and (*c*) the " therapeutic test " of improvement following the correction of the deficiency.

The manifestations of vitamin deficiency are more common in primitive countries where poverty and other economic and social factors are primary causes of an inadequate diet. Parasitic disease and other secondary factors combine with these primary causes to establish a vicious cycle in which the result of malnutrition leads to lowered productivity, more disease and further malnutrition. Abuse of antibiotics may also cause a secondary avitaminosis by interference with those synthetic processes which are responsible for the manufacture of vitamins within the body.

The author believes that the eye manifestations of ariboflavinosis may be due to the fact that the vitamin deficiency interferes with the metabolic processes in the non-vascularized parts of the organ.

Among approximately 10,000 eye patients seen in Somaliland in the course of 3 years, 750 had senile cataract. The author believes that ariboflavinosis may be an important contributory factor in the aetiology of these cases and riboflavin should then form part of the treatment. With an improvement in environmental hygiene and nutrition, the incidence of senile cataract in the tropics will probably diminish. *J. Cauchi*

Bachrach, U., Gurevitch, J., Landau, J. & Birnbaum, D. **The Flora of the Normal Conjunctiva of Healthy People in Israel.** *Acta. Med. Orientalia.* 1953, Jan., v. 12, No. 1, 10–13.

There is a considerable divergence of opinion on the bacteriological findings in the normal conjunctiva, some workers reporting from 20 to 70 per cent. negative results, while others claim to have found some organisms in 85 to 100 per cent. of normal conjunctivae. The authors, in Jerusalem, examined bacteriologically the conjunctivae of 277 healthy people, made up of student nurses, medical students, obstetric patients and schoolchildren : there were no significant differences between the various groups.

The study was made in the winter of 1951–52.

The conjunctiva was adjudged to be normal on clinical grounds and on the absence of past conjunctivitis.

Material was taken from the region of the lower fornix, away from the edge of the eyelid, and was transferred into brain heart infusion broth, thioglycolate broth and on to blood agar. For attempting to isolate Morax-Axenfeld bacilli and Koch-Weeks organisms, Loeffler and Levinthal plates were used. Results were not considered negative unless media were sterile for 5 days.

Two tables show the varying results with different media and the detailed bacteriological findings. Of the 277 cases, 186 (67·4 per cent.) were shown to harbour micro-organisms. In 116 (42 per cent.) good growth was obtained after 24 hours in brain heart infusion broth and on blood agar : in 70 positive cases (37·74 per cent.) growth was obtained on one medium only. The commonest organisms found were *Staph. albus* (51·6 per cent.) and corynebacteria (39 per cent.) alone or in combination. The corynebacteria were *C. pseudodiphtheriae* (26 per cent.) and *C. xerosis* (13 per cent.). *Strep. viridans* was found in 10 cases, *Strep. faecalis* in 1, *Neisseria* and Friedländer's bacillus in 4 each and pneumococci in 2. The prevalence of the first two species is in agreement with the findings of various other workers.

No Morax-Axenfeld bacilli were found although other workers have reported up to 22 per cent. It is remarkable that the *Haemophilus* of Koch-Weeks was not found, although the specific conjunctivitis was until recently widespread in Israel. This is attributed partly to the time of year (winter) and possibly to the success of antibiotics and DDT. *H. J. O'D. Burke-Gaffney*

MONBRUN, A. Les trachomateux algériens en France. [**Trachoma in Algerian Immigrants Living in France**] *Bull. Acad. Nat. Méd.* 1953, v. 137, Nos. 3/4, 70–72.

There are over 300,000 North Africans in France and over 90 per cent. of these are Algerians ; in the Paris region alone, there are more than 100,000 Algerians. Since 1944, Algerians have been French citizens, so that they are able to emigrate freely to Metropolitan France without travel restrictions. There is a constant coming and going, and trachoma is continuously introduced and spread. The spread is facilitated by the wretched conditions under which many of the Algerian immigrants live, particularly when they first arrive. Most of them suffer or have suffered from trachoma : because of their poor eyesight many can obtain only unskilled work, much of their meagre earnings is spent to support their families in Algeria, and they are obliged to live under bad hygienic conditions.

Most of those attending eye-hospitals in France require to be admitted, even when they have minimal lesions, for they are often unable to take care of themselves and have no one to do so for them : for the same reason they often require to be kept in hospital after they have been cured, as they have nowhere to go.

Important medico-legal problems also arise. The damaged corneo-conjunctival epithelium is liable to be the seat of acute attacks and complications after the simplest of secondary infections or injuries. As the Algerians enjoy the rights of French citizens, they are entitled to sickness and accident insurance benefits. It is common for such workers to attribute aggravation and complications of trachoma to work factors and to apply for workman's compensation instead of ordinary sickness insurance. Although the Social Security organization has appointed experts to determine whether the lesions in question may be attributed to the alleged traumatism, it is extremely difficult to state that an eye injury has not aggravated a pre-existing trachoma.

The author gives figures to show how common such cases may be and points out that they are a heavy drain on public funds. He suggests that such a universal scourge as trachoma, causing so much blindness, should be controlled by international regulations : some countries do not admit immigrants with trachoma. Sanitary control is however limited in the case of Algerian immigrants because of their status as French citizens. However, vaccination certificates are required, and it is suggested that analogous measures could,

without infringement of rights, be introduced in the case of trachoma, for example, a medical certificate stating that the immigrant was free from trachoma. It is also suggested that an organization be set up in Algeria, which would advise travellers, and restrict the number of emigrants, by impressing on them the need for medical examination before embarkation and for security of work and accommodation in advance of their departure for France. *H. J. O'D. Burke-Gaffney*

MISCELLANEOUS DISEASES

YAP, P. M. **The Latah Reaction : its Pathodynamics and Nosological Position.** *J. Mental Sci.* 1952, Oct., v. 98, No. 413, 515–64. [Numerous refs.]

" A critical review of the literature on latah is given in Sections I and II, and the hitherto unsatisfactory treatment of the subject is pointed out. In Section III a full account is given of the Jumpers because of their importance as an example of the latah reaction occurring among people of Caucasian stock in a temperate climate. Sections IV and V deal with *miryachit* and *imu*, including a review of the relevant literature.

" In Section VI the latah reaction is related to ' sleep intoxication ' and the so-called ' startle neurosis,' and differentiated from convulsive tics and ' primitive hysteria.' The meaning of the last is examined and it is suggested that the behaviour covered by it should be included under Kretschmer's ' primitive reactions.' The meaning of hysteria is discussed in Section VII and Kretschmer's analysis of it is regarded as the most adequate. It is suggested that where a morbid gain cannot be demonstrated hysteria should not be diagnosed even though ' hysterical mechanisms ' are involved ; but instead the case should be classed with fright neurosis or the psychosomatic organ neuroses. In Section VIII the term ' fright neurosis ' is shown to be preferable to ' traumatic neurosis ' and is distinguished clearly from organic post-concussion states, traumatic hysteria and the primitive reactions.

" In Section IX cases observed personally by me in Malays are described, and two hitherto unnoticed symptoms as well as the general features of latah are discussed.

" Section X is devoted to the pathodynamics of the reaction. The factors of fright, tickling, habituation, aging and hysterical gain are dealt with. Latah is considered to be essentially an intense fright reaction involving disorganization of the Ego and obliteration of the Ego-boundaries. A theory of automatic obedience and the echo-reactions is given : this states that fright provokes inhibitory processes which bring about ' suppression ' (Rivers) of perceptual activity ; impairment of the perception of local signature leads to a dissolution of the boundaries of the Ego as has been shown by Uexkull, so that the patient's behaviour becomes more directly determined by forces in the total behavioural field according to Gestalt principles ; this manifests itself in echo-phenomena and automatic obedience. Coprolalia is interpreted as a symbolic (verbal) defensive act. The affinities of the latah state to hypnosis and fascination are discussed.

" Section XI critically reviews such aetiological theories as have been put forward. A special modifying of personality and of the organization of fear in persons belonging to cultures of low technological level is suggested. The nosological position of latah is dealt with in Section XII, and it is concluded that latah is a specialized form of fright neurosis, with minimal hysterical

features, culturally maintained, and found only in persons whose powers of mastery and of defence are limited by the level of their own cultural development.

"In Section XIII it is pointed out that organization of the different emotions varies with the cultural *milieu* and that it is of great importance for comparative psychiatry to recognize this ; the usefulness of applying the concept of a special fear-organization to the analysis of latah is stressed. Finally, some suggestions for further research are given."

HILL, K. R. **The Vomiting Sickness of Jamaica. A Review.** *West Indian Med. J.* 1952, Oct., v. 1, No. 3, 243–64. [45 refs.]

This article by Professor Hill is, in the abstracter's opinion, a most fair, unbiassed and impartial account of this vexed subject. The author starts with a brief history of the disease from the time when it began to attract special attention almost 70 years ago. He next presents a detailed clinical account and describes the post-mortem findings, the differential diagnosis and discusses the causation, with particular stress on malnutrition or innutrition and food poisoning, yam, cassava and, above all, ackee, but, as the author shows, only the last (and that under certain conditions only) gives rise to acute and in many cases rapidly fatal, illness with the typical symptoms and course of the true Vomiting Sickness of Jamaica. There is, unfortunately, not space here to comment on separate points, *e.g.*, the part played by malnutrition, except to say that this may act in two ways, by reducing resistance to any disease and by inducing people in general, and children in particular to pluck the forbidden fruit, but, as SCOTT showed in his original monograph [this *Bulletin*, 1917, v. 9, 90 ; v. 10, 102 ; also 1915, v. 6, 426 ; 1916, v. 7, 380], well-nourished persons in perfect health may suffer and not only the poor and ill-nourished.

In the abstracter's opinion, Professor Hill has presented a masterly summary which should be read and studied carefully by anyone engaged in investigating this interesting disease. The next stage, we hope, will be an intensive search for the toxic principle. Scott suggested 37 years ago that it was probably a glucoside and to this the experimental work of EVANS and ARNOLD added support [see this *Bulletin*, 1939, v. 36, 412]. *H. Harold Scott*

RAPER, A. B. **Nephritis and Allied Lesion in Central Africans. A Contribution from Autopsy Work.** *East African Med. J.* 1953, Feb., v. 30, No. 2, 49–58. [18 refs.]

"1. Examples of Bright's disease encountered over five years of autopsy work in Kampala, Uganda, have been re-examined and defined on histological grounds.

"2. The lesions revealed correspond with those common in Britain, with certain exceptions.

"3. Malignant hypertension was not seen; chronic pyelonephritis is common. A form of renal sclerosis, probably allied to pyelonephritis, is described.

"4. An unusual form of amyloidosis of the kidney is described.

"5. No evidence was obtained that renal disease in Uganda is attributable to malnutrition or malaria, except perhaps amyloid disease."

WILKINSON, J. **A Fatal Case of Onyalai in Kenya.** *East African Med. J.* 1953, Feb., v. 30, No. 2, 69–73. [11 refs.]

"Onyalai is defined and a fatal case in a Kikuyu tribesman of Kenya is described and certain features of the case briefly discussed."

VAN GINKEL, J. H. R. Longinfiltraten met eosinophilie. [**Pulmonary Infiltrations with Eosinophilia**] *Nederl. Tijdschr. v. Geneesk.* 1953, Feb. 21, v. 97 (i), No. 8, 472–5, 8 figs. on 1 pl. [20 refs.]

The English summary appended to the paper is as follows :—

"The syndrome described by Löffler, with mild or no symptoms and transient pulmonary infiltrations, as a rule disappears within 6–12 days. A number of cases are described in which more marked clinical findings persisted for several months. This group of diseases of the lungs also includes tropical eosinophilia and those cases of pulmonary eosinophilia associated with asthmatic symptoms (Harkavy). In this article a personal observation of a case of prolonged pulmonary eosinophilia is described. Three months after the onset of the illness ascaris-eggs could be traced in the stools."

SPADARO, O. Osservazioni e considerazioni sulle principali malattie infettive dell'Eritrea. [**Observations and Considerations on the Principal Infectious Diseases in Eritrea**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, Dec., v. 33, No. 12, 666–708. [Numerous refs.] English summary (4 lines).

The author has practised medicine in Eritrea for a period of 11 years and his experience has included work in the public health laboratory, in port sanitation, in municipal public health and in hospital. This paper is a series of notes, covering a large number of infections with rickettsiae and viruses, bacteria, protozoa and helminths. The literature and the author's own experience and deductions are referred to in each case.

Indigenous cases of malaria have generally not been encountered at altitudes of over 1,000 metres above sea level. Blackwater fever is rare in the whole country. Various types of rickettsioses and of relapsing fever are to be found occurring in both endemic and epidemic forms : the well-known preventive measures are discussed.

Dengue is endemic, but no yellow fever has been recorded in spite of the prevalence of *Aëdes aegypti*.

Brucellosis is now frequently met with in both man and animals and the wider use of unpasteurized fresh milk, and of cheese made from the same, is believed to have been a factor in the spread of this disease.

Both amoebiasis and giardiasis are common in Eritrea. The incidence of various forms of helminthiasis is briefly discussed.

As in many other parts of Africa, lobar pneumonia is common and frequently proves fatal among the Africans. Pulmonary tuberculosis shows a higher incidence in the highlands than in the lowlands, in urban than in the less congested rural communities, in the Coptic than in the Muslim sections of the population. The reasons for these differences are briefly referred to and the author gives the broad results of some biochemical research which he has carried out and which he has published more fully elsewhere.

Measles, scarlet fever and whooping cough appear to be rare and smallpox has become rare in the last half century as a result of vaccination measures. Vaccine lymph (type not stated) is made in Asmara and it is supplied to the Yemen and the Hedjaz on the opposite shore of the Red Sea.

Epidemics of cerebrospinal fever seem to have been rare. Syphilis and lymphogranuloma are universal, leprosy is common and generally of the nodular type, yaws is rare. [The author makes no mention of gonorrhoea which is so frequently met with in other parts of Africa.]

J. Cauchi

Ives, J. C. J. & Thomson, T. J. **Chronic Melioidosis : the First Report of a Case infected in Central India.** *Glasgow Med. J.* 1953, Feb., v. 34, No. 2, 61–7, 2 figs. [24 refs.]

Details are given of a case of melioidosis, believed to be the first reported from central India. The patient, a Scots mining engineer aged 40, had a boil on the thigh, followed by a long febrile illness suggesting a septicaemia, although repeated blood cultures gave negative results. He was thought to have an amoebic abscess of the liver. Laparotomy about 3 months after the onset of illness revealed no lesion but the liver continued to enlarge slowly and, at a second operation 6 months later, multiple honeycomb abscesses of the liver and a single abscess of the hilum of the spleen were found. The patient did not survive. *Pfeifferella whitmori* was isolated from the yellowish-white pus from the liver abscesses. The strain was typical in its characters and gave the following results in sensitivity tests *in vitro* by a serial dilution method.

Penicillin	resistant to 20 units/ml.
Streptomycin	sensitive to 50 μgm./ml.
Chloramphenicol	sensitive to 50/μgm./ml.
Aureomycin	sensitive to 50 μgm./ml.
Terramycin	sensitive to 25 μgm./ml.
Sulphatriad	sensitive to 7 μgm./ml.

During the first few months of his illness, the patient had received courses of treatment with all these drugs, except chloramphenicol, without benefit.

J. C. Cruickshank

PROTOZOOLOGY : GENERAL

Hoare, C. A. **The Taxonomic Status of Biological Races in Parasitic Protozoa.** Reprinted from *Proc. Linnean Soc. of London.* 1952, May 16, Pt. 1, 44–7. [16 refs.]

This paper gives a useful summary of the author's views on the status of biological races, which he has expounded more fully elsewhere [see this *Bulletin*, 1944, v. 41, 150]. Biological races are subdivisions of species, recognizable by differences in biological characters only. Some differences are solely immunological in nature such as the relapse strains of trypanosomes or spirochaetes, others are more stable and relate to virulence like so-called species of *Theileria*, or to host adaptability like the malaria parasites common to chimpanzees and man, or the African trypanosomes of the *brucei* group. Some flagellates of similar morphology infect the same host but produce entirely different diseases, such as *T. equiperdum* (causing the venereal disease dourine) and *T. evansi* (causing the insect transmitted surra) ; and the different leishmanial diseases of man. Particularly in medical and veterinary protozoology, these different forms are often given specific status. This is obviously incorrect, though recent work on the genetical aspect of systematics (as in *Drosophila*) demonstrates that the mechanism (and permanence) of production of new biological races is exactly the same as that causing actual specific differentiation. The author now thinks there is no need to introduce an extra systematic name for the former; the least stable " varieties " with physiological differences only should be treated merely as morphae ; when stability is ensured by permanent hereditary transmissibility, they can be classified as subspecies ; once structural differences become manifest, then a new species is recognizable. *P. C. C. Garnham*

Singh, S. **Toxoplasmosis in India.** *Indian Physician.* 1952, Oct., v. 11, No. 10, 209–20, 8 figs. on 2 pls. [12 refs.]

The author gives a concise account of the pathology, clinical picture and diagnosis of toxoplasmosis and of the Sabin-Feldman syndrome. He then reports 4 cases, of which 2 are classed as the Sabin-Feldman syndrome ; in these the serological reactions were negative—or positive in very low titre—cerebral calcifications were absent, but there was extensive chorioretinopathy. The third patient had bilateral chorioretinitis and cerebral calcifications, but serological reactions were not done. The fourth patient was an Indian boy of 9 years with fits and very defective vision. The fits started in early infancy. His vision was " finger counting at 2 metres in both eyes ". There was a squint and nystagmus. He had bilateral micro-cornea, an extensive healed central chorioretinitis with a central atrophic patch and marked temporal pallor of the disk in each eye. X-ray of the skull showed areas of calcification especially in the parietal region. The dye test was positive 1 in 8 and 1 in 16 in the child and 1 in 128 in the mother : in the latter the complement-fixation test was positive. These tests were done in the United States.

L. E. Napier

Hirschlerowa, Zofia & Kozar, Z. **Observations concerning the Morphology and Behaviour of** *Toxoplasma gondii*. *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1952, v. 4, No. 3, 275–8. [Also fuller version in Polish 255–68, 3 text figs. & 19 figs. on 2 pls. & in Russian 269–74.]

This paper is devoted to the morphology and life-history of *Toxoplasma*, based on studies of a human strain passaged through mice and guineapigs. Observations were carried out on parasites from the peritoneal exudate, in tissue cultures on chick embryos, and in some cases in sections of the infected organs as well. Smears were prepared by the " wet " method, and dark-field phase-contrast microscopy were also employed.

The authors first consider the localization of the parasites, which, according to their observations, are invariably intracellular. If care is taken in making the preparation, free parasites are rarely encountered in the exudate. They are represented by crescent-shaped forms which have escaped from ruptured mature pseudocysts, and serve to infect new host-cells. The presence in smears of the exudate of numerous free parasites, described by some authors, is due to the rupture of the fragile host-cells with the liberation of immature forms. After invasion of a new host-cell the parasite multiplies, giving rise to a variable number (10–128) of pyriform or rounded daughter-individuals of equal size, which are sometimes arranged in several groups, but do not form a syncytium, as claimed by some authors. Division of the cytoplasm appears to be at first transverse, but later the division cleft undergoes axial torsion, with the result that the fission appears to be longitudinal. The nuclear division is by mitosis, different stages of which are illustrated in figures. In some forms the authors have observed flagella-like appendages, the significance of which was not clear.

C. A. Hoare

Beverley, J. K. A. & Beattie, C. P. **Standardization of the Dye Test for Toxoplasmosis.** *J. Clin. Path.* 1952, Nov., v. 5, No. 4, 350–53, 1 fig.

The authors have standardized the technique of the Sabin-Feldman dye-test for the diagnosis of toxoplasmosis, bearing in mind the variable factors present in the test, which they have attempted to eliminate or correct.

For that purpose, the patient's serum is not inactivated but stored at +4°C., and dilutions are made in saline. As sources of activator, donors are selected

whose serum is free of toxoplasm-antibodies. This serum is bottled in 5 ml. amounts and stored at −20°C. until required (its potency is retained up to 3 months). The saturated alcoholic solution of methylene blue is made freshly on the day of the test. The toxoplasm suspensions are obtained from the peritoneal exudates of 8–10-week-old mice inoculated 3 days previously. The number of mice used depends on the number of tests to be made, one mouse providing 0·5 ml. which is sufficient for 4 tests. The suspension is used for the test immediately.

The set-up of the test is shown in the following table :—

Tube	1	2	3	4	5	6
Patient's serum	2 drops Undiluted	2 drops 1 : 2	2 drops 1 : 4	2 drops 1 : 8	2 drops 1 : 16	—
Saline	—	—	—	—	—	2 drops
Activator ...	4 drops	4 drops	4 drops	4 drops	4 drops	4 drops
Toxoplasma suspension	2 drops	2 drops	2 drops	2 drops	2 drops	2 drops

The tubes are incubated for 1 hour in a water bath at 37°C. and methylene blue is added as follows :—

Methylene blue	6 drops	6 drops	6 drops	6 drops	6 drops	6 drops
Final dilutions	1 : 4	1 : 8	1 : 16	1 : 32	1 : 64	Control

The tubes are kept in a refrigerator and removed as the examination proceeds.

The test is read as follows : the number of toxoplasms in the suspension is determined in the control tube by counting in a Neubauer counting chamber the stained extracellular parasites. Then the percentage of stained and unstained parasites is determined in the other tubes, by examining 100 parasites in a drop between slide and coverslip under a $\frac{1}{6}$ in. objective. In calculating the results, the highest dilution which inhibits the staining of 50 per cent. of the toxoplasms is taken as the end-titre. The results obtained for a given concentration of parasites are then corrected to a standard of 30,000 parasites per cmm.

With this method of carrying out the dye-test, the authors suggest that the following titres are possibly significant in different age-groups : up to 10 years 1 : 16, 10–20 years 1 : 32, over 20 years 1 : 64. *C. A. Hoare*

Wildführ, G. & Hudemann, H. Über den Erregernachweis bei Toxoplasmose durch Tierversuch und das serologische Verhalten verschiedener Toxoplasmastämme. [**Parasitological Diagnosis of Toxoplasmosis and the Serological Reactions of Different Strains of** *Toxoplasma*] *Zent. f. Bakt.* I. Abt. Orig. 1952, Dec. 20, v. 159, Nos. 1/2, 115–30, 4 graphs. [12 refs.]

In the first part of this paper an evaluation is made of the parasitological diagnosis of human toxoplasmosis by inoculation of material from the patient into laboratory animals. The material was provided by 31 infants in whom the disease was diagnosed clinically and serologically (dye-test). Mice and hamsters were inoculated intraperitoneally with the patients' cerebrospinal fluid

(28 cases), saline suspension of teased-up eye (2) and brain tissue (1). The results were positive in 12 experiments, in 11 of which the animals were infected with cerebrospinal fluid and in one with eye material including a glioma. The animal experiments were carried out through 2 further passages, and sometimes the parasites were detected only in the 2nd passage. In patients who failed to infect the rodents the dye-test titre was lower than in the positive cases.

In order to determine whether various strains differed serologically, rats were infected with 10 strains of *Toxoplasma*, including 8 isolated in the present study, and their sera, as well as those of some of the patients, were used in the dye-test against parasites of all the strains. It was shown that from the serological point of view all these strains were identical but they differed from each other quantitatively, in the titre at which the reaction took place.

C. A. Hoare

Sabin, A. B., Eichenwald, H., Feldman, H. A. & Jacobs, L. **Present Status of Clinical Manifestations of Toxoplasmosis in Man. Indications and Provisions for Routine Serologic Diagnosis.** *J. Amer. Med. Ass.* 1952, Nov. 15, v. 150, No. 11, 1063–9. [Refs. in footnotes.]

This paper is a report by a committee constituted under the aegis of the United States Public Health Service, with the senior author as chairman.

At birth the following clinical signs suggest the possibility of toxoplasmosis:—rash, jaundice, encephalitis, hepatomegaly, hydrocephalus, microcephaly and chorioretinitis. During infancy as well as the above there may be convulsions and psychomotor retardation and on X-ray examination cerebral calcifications ; the latter, however, are quite often absent. In the presence of any considerable combination of these signs, but especially of the tetrad, chorioretinopathy, cerebral calcifications, hydrocephaly or microcephaly, and psychomotor disturbances, serological investigations should be undertaken. However, the committee do *not* recommend routine serological examinations in the following conditions, because toxoplasmosis is only rarely responsible :—Chorioretinitis of unknown cause in adults and children acquired after birth, retrolental fibroplasia, cerebral palsy, and various other manifestations of neonatal or congenital cerebral or ocular damage, fevers of unknown cause, " glandular fever " or lymphadenitis of unknown cause, infectious encephalitis of unknown cause, spontaneous abortions of unknown cause, or exanthematous fevers of unknown cause simulating rickettsial infections, or the detection of acute toxoplasmosis during pregnancy.

The serological tests used are the dye or cytoplasm-modifying test, the complement-fixation test, and the dermal sensitivity (intradermal) test. The dye test becomes positive in 10 to 20 days after infection, in titres of 1 in 256 to 1 in 4,000, and may persist at a high level for 5 years. A large proportion of normal persons have a titre of 1 in 64 or less and a few up to 1 in 256 ; the higher titres are more common in children than in adults. The complement-fixation test becomes positive later and fades earlier.

Reference is made to an accidental laboratory infection which was symptomless throughout ; the dye-test titre rose to 1 in 16,000 on the 30th day after infection, whereas the complement-fixation test was negative until the 32nd day. The dermal test is of no diagnostic value.

The authors conclude " The cytoplasm-modifying or dye test for the detection of Toxoplasma antibodies is recommended for routine purposes . . . . . The complement-fixation test is recommended as a routine procedure only for those children with suspected congenital toxoplasmosis who show high dye test titers during the first weeks of life, because it is the only serologic procedure that can indicate whether or not the infection is recent and active. When the

mother's serum was high titers of both antibodies and the child's serum has a high titer of dye test antibody but no complement-fixing antibody, a recent and active infection with Toxoplasma can be postulated."

The paper includes full details of the procedure for carrying out the dye test.

L. E. Napier

BURKINSHAW, J., KIRMAN, B. H. & SORSBY, A. **Toxoplasmosis in relation to Mental Deficiency.** *Brit. Med. J.* 1953, Mar. 28, 702–4.

"The 55 toxoplasmin-positive patients found in a population of 698 mental defectives have been scrutinized for evidence of toxoplasmosis. Most of the patients were children. The incidence of positive cases increased with advancing age. In two cases eye lesions suggestive of toxoplasmosis were found. Radiology and lumbar puncture showed no findings suggestive of toxoplasmosis. In no cases could the mental defect be definitely attributed to toxoplasmosis. In some cases other definite causal factors were present—for example, epiloia, phenylketonuria, mongolism. It was concluded that in mental institutions or elsewhere a positive toxoplasmin reaction is acquired like a positive Schick reaction with increasing age, and is very infrequently associated with clinical toxoplasmosis ; and that toxoplasmosis is not a common cause of mental defect."

VIVELL, O. & BUHN, W. H. Über eine Toxoplasmoseepidemie in einem Tierstall mit kleinen Laboratoriumstieren. [**An Epidemic of Toxoplasmosis among Small Laboratory Animals**] *Ztschr. f. Hyg. u. Infektionskr.* 1952, Sept. 15, v. 135, Nos. 3/4, 298–306, 1 fig. [54 refs.]

The authors describe a spontaneous outbreak of toxoplasmosis among rabbits and guineapigs in the animal house of the Freiburg University Clinic, lasting from the Spring of 1951 to the beginning of 1952. In the early stages of the outbreak the disease was attributed to other causes but further investigations revealed in the animals positive serological reactions, typical clinical symptoms and histopathological changes of toxoplasmosis, finally confirmed by the demonstration of parasites in the peritoneal exudate of some of the animals.

It is thought that, in the first instance, the infection was introduced by a rabbit with a latent infection, which was transmitted to other rabbits, by means of a thermo-element, which was used for measuring their rectal temperatures. From the rabbits the infection spread to guineapigs which were kept in the same cage with the rabbits.

C. A. Hoare

EYLES, D. E. & COLEMAN, Nell. **The Relative Activity of the Common Sulfonamides against Experimental Toxoplasmosis in the Mouse.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 54–63. [15 refs.]

Since sulphonamides are generally regarded as possessing some activity in *Toxoplasma* infections of mice, some of the better known compounds have been compared under standard conditions in order to decide which was most effective. The compounds used were sulphadiazine, sulphamerazine, sulphamethazine, sulphathiazole, sulphapyridine, and sulphanilamide. In contrast to other workers CROSS [this *Bulletin*, 1951, v. 48, 837] believes that sulphadiazine is ineffective but the present authors have used it as a standard when estimating the activity of other drugs.

A strain of *Toxoplasma gondii* was used which had been isolated from a wild rat, and invariably produced fatal infections in mice in which the strain was maintained by bi-weekly passage. Mice of 20 gm. weight were inoculated

with 20,000 organisms obtained from peritoneal exudate, the survival period being invariably less than 10 days. Drug was given in the diet immediately after inoculation, generally for 14 days or until death occurred. For estimation of drug activity the median effective dose, defined as that which enables half the animals to survive for 10 days or longer, was determined. In a single experiment 5 groups of 9 mice were used and received doses decreasing in geometrical ratios. Untreated controls, both infected and uninfected, were included in the experiment.

Pyrimidines, which include the first 3 named substances, were about equally effective, and were the most efficient, but the survival rate was well below 100 per cent. The results are not applicable to man but the doses used were well within the tolerated range for human subjects and the mouse, moreover, develops no immunity as the result of infection. Besides being the most active substance tested, sulphadiazine was found to act synergically with Daraprim, which is itself active against the infection in mice. *J. D. Fulton*

Eyles, D. E. & Coleman, Nell. **Antibiotics in the Treatment of Toxoplasmosis.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 64–9. [12 refs.]

A uniform series of tests has been carried out against *Toxoplasma* infections of mice with a number of antibiotics under the conditions described in the preceding abstract [see above, 1953, p. 568]. When a screening test was carried out a dose of drug approximating to the maximum tolerated was used and results were judged by comparing the mean life span of the treated animals of the group with that of controls. In the case of antibiotics with a wide range of activity it was found that massive doses of aureomycin, terramycin, fumagillin, and chloramphenicol prolonged the life of mice but there were marked differences in their effectiveness. Cures were obtained with aureomycin only, but at doses unattainable in man ; in some cases quoted it proved of no value for human patients. Viomycin, neomycin, fracidin, prodigiosin, and R-2007 were without action. *J. D. Fulton*

Zaher, F., Isenberg, H. D., Rosenfeld, M. H. & Schatz, A. **The Distribution of Soil Actinomycetes Antagonistic to Protozoa.** *J. Parasitology.* 1953, Feb., v. 39, No. 1, 33–7. [18 refs.]

" For many serious protozoan infections of man satisfactory means of chemotherapy is lacking. The present study explored the antibiotic approach to this problem. The test organisms were *E. gracilis*, *H. culicidarum*, and *T. geleii* which grow readily in pure culture. Since most of the antibiotics efficacious in treating bacterial infections are products of actinomycetes, this group was investigated, in preference to bacteria and molds, for the ability to synthesize antiprotozoan agents.

" The present study indicated that in only 46 out of a total of 738 tests did inhibition of protozoan growth occur. Of the 82 actinomycetes, 27 or 33 per cent were active. The two flagellated protozoa were far more sensitive than the ciliate.

" At least five of the 82 actinomycetes elaborated heat-stable antiprotozoan agents, one of which was inhibitive to *H. culicidarum* at a dilution greater than 1 : 100.

" The fact that only 11 out of 20 antiprotozoan actinomycetes inhibited one or more of four test bacteria by the usual streak technic on nutrient agar emphasizes the unsuitability of bacteria as test organisms for the isolation of antibiotics inhibitive to protozoa."

ENTOMOLOGY AND INSECTICIDES : GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

HAMBLETON, E. J. **Entomology in the Point Four Program.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1103–8.

This is a very general article outlining the work of Americans against insect pests in different parts of the world under the terms of the Point Four Programme, which lays down that the United States of America may provide, if requested, technical co-operation to underdeveloped nations. Although some brief reference is made to the control of vectors of malaria, yellow fever, typhus and plague, the article draws its more detailed examples from agricultural pests. Since the paper deals with the problems of increased food yields and saving of wastage from insect destruction, it will be of interest to those concerned with the many aspects of food production in underdeveloped countries. *D. S. Bertram*

See also p. 474, WOLFS, La faune culicidienne des forêts de bambous et de Costermansville. [**Mosquito Fauna of the Bamboo Forests at Kivu, and Costermansville**]

DE MEILLON, B. & HARDY, Felicity. **New Records and Species of Biting Insects from the Ethiopian Region—III.** Reprinted from *J. Entom. Soc. of Southern Africa.* 1951, May, v. 14, No. 1, 30–35, 2 figs.

LEVÍ-CASTILLO, R. Lista provisional y distribución de los mosquitos Culicinos en el Ecuador. [**Provisional List and Distribution of Culicine Mosquitoes in Ecuador**] *Rev. Ecuatoriana de Entom. y Parasit.* Guayaquil. 1953, Jan., v. 1, No. 1, 34–45. [14 refs.]

JONES, J. C. **A Chamber for Observations on Living Larvae of Anopheline Mosquitoes.** *Science.* 1953, Jan. 9, v. 117, 42, 1 fig.

GIL COLLADO, J. Los anofelinos de Fernado Póo. [**Anophelines of Fernando Po**] *Med. Colonial.* Madrid. 1953, Feb. 1, v. 21, No. 2, 113–25, 17 figs. & 1 map.

Brief notes on the breeding places and adult habits of the 5 species of *Anopheles* are recorded from the island : *A. gambiae, A. funestus, A. lloreti, A. smithi* and *A. cinctus.* Keys to the adults and larvae are provided primarily to enable other workers on the island to recognize any other anopheline so far not found. Culicine larvae associated with one or more of the anophelines in their breeding places are : *Culex invidiosus, C. nebulosus, Culex tigrips* var. *fuscus, Uranotaenia mashonaensis, Aëdes tarsalis,* and *Finlaya uniformis* var. *malfeyti.* The illustrations consist of a very simple map of the island and taxonomic figures. *D. S. Bertram*

GALVÃO, A. B. *Anopheles* (*Anopheles*) *rachoui,* uma nova espécie de grupo *Arribalzagia.* [*Anopheles rachoui,* a **New Species of the** *Arribalzagia* **Group**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Jan., v. 4, No. 1, 69–74, 2 figs. English summary (7 lines).

Baz, I. I. *Dixa aestivalis* **in Egypt.** *J. Roy. Egyptian Med. Ass.* 1950, v. 33, No. 12, 1021–8, 5 figs.

" 1. The specimens from Alexandria and Siwa Oasis, Egypt, examined by the author, proved to be *Dixa aestivalis* according to Edwards' Key, or *Paradixa aestivalis* according to Martini's classification. This species is present also in South Europe and Greece. The larvae of this species resemble the larvae of anophelines and could be easily mistaken for them. These larvae were found in stagnant water of drains and in association with *Culex pipiens*, *C. perexiguus*, *Anopheles mauritianius*, *A. pharoensis* and *A. sergenti* in the Oasis."

Roman, E. Eclosion sur substrat humide des pontes de moustique citadin. [**Hatching of Urban Mosquito Eggs Under Humid Conditions**] *C.R. Soc. Biol.* 1952, Sept., v. 146, Nos. 17/18, 1336–7.

Egg rafts of *Culex pipiens* were placed on strips of moist filter paper, or on glass, in partly or fully saturated air. Normal rates of hatching occurred on moist filter paper in saturated air, but there was a delay of one day in " rather dry " air and early deaths occurred among emerged larvae. On a non-absorbent dry surface (glass) in saturated air the operculum opened but emergence did not take place. In other experiments purporting to define the lower limit of atmospheric humidity consistent with successful emergence, it was found that the eggs were killed at relative humidities below 95 per cent., and between this and saturation the operculum opened but actual emergences did not follow.

D. S. Bertram

Repass, R. P. **Laboratory Colonization of** *Aëdes triseriatus*. *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1076.

This is a brief account of successful maintenance for some six generations of *Aëdes triseriatus*, a tree-hole breeder, in the laboratory. Water from tree-holes, or tap-water, was used for rearing larvae, powdered dog biscuit being added daily as food. Adults were kept in cages 2 in. × 2 in. × 3 in., in a room at 77°–79°F. and a relative humidity of 75 to 80 per cent. Human blood was taken more readily than rabbit or chicken blood. For oviposition, blocks of dried wood (oak), 1·5 in. × 1·5 in. × 3 in., were set in water half an inch deep in white enamel pans. Eggs were laid just above the water level. The blocks were removed, allowed to dry for several days, and then submerged in tap-water. Hatchings followed within 12 hours. Eggs were viable after at least 6 weeks' desiccation. When the wood surface provided for oviposition consisted of bowls made of pine or of cypress wood, none of the eggs hatched. [This paper is factual ; no attempt is made to discuss the possible causes when eggs failed to hatch.]

D. S. Bertram

Sippell, W. L. & Brown, A. W. A. **Studies of the Responses of the Female** *Aëdes* **Mosquito. Part V. The Role of Visual Factors.** *Bull. Entom. Res.* 1953, Jan., v. 43, Pt. 4, 567–74, 3 figs. on pl.

The part played by sight factors in attracting the female *Aëdes* mosquito to a body was compared with that played by air-borne factors. Both living and inanimate objects were employed, Prairie deer mice being selected for the former : these have the grey-brown agouti colour pattern and are slightly larger than normal white laboratory mice.

A transparent, airtight and empty plastic box was compared with a similar plastic box containing a mouse. In this way the sight factor could be assessed in the absence of any air-borne factors. The number of mosquitoes attracted

to the box containing the mouse was greater, giving a ratio of 1·53 to 1. This experiment was repeated with both boxes perforated : the ratio increased to 1·58.

An air-tight transparent box containing a mouse was compared with a similar perforated box also with a mouse. The effect of adding air-borne factors to visual factors was thus determined and the ratio obtained here was 1·21.

An airtight transparent box with a mouse was next compared with a perforated opaque box to assess the effect of air-borne factors alone against visual factors alone. In this case the air-borne factors proved the most important but the difference between the number of mosquitoes attracted to each box was much reduced giving a ratio of 0·73.

The above experiments were carried out on anaesthetized mice, but were repeated with normally moving animals. In this second series the effect of visual factors was found to be enhanced by movement. The fourth experiment showed that when the animal was mobile the sight factor was more important than the air-borne one, but when immobile the air-borne factor played the greater part.

When a normally moving mouse was compared with an immobile one, both in air-tight boxes, figures indicated that the moving animal was nearly twice as attractive.

Comparison between moving and immobile inanimate objects was made, the objects chosen were a pair of dull black cylindrical canisters. In the first series warm, moist air was emitted from both at 2·5 litres per minute, in the second series no air was emitted ; figures here showed that nearly twice as many mosquitoes were attracted to the moving body as to the stationary one.

Investigation into the superior attraction of black enamel over a flat black surface was carried out. The black enamel was 42 per cent. more attractive than the flat black surface and a silvered mirror 55 per cent. more attractive than a lacquered metal surface. Thus the mirroring surface was, in each case, about one-half as attractive again as the non-mirroring surface. The only effect which enhanced the attraction of a black surface was lines of shadow, and then only when these were swept across the surface.

The factor of contour was also investigated with cubes painted with alternating stripes of black and white, the attraction now increased with the ratio of black to white. With cubes painted with alternating square checks of black and white the attractiveness increased as the black-white interface increased, although the proportion of black to white remained constant. For a constant proportion of black to white interface, stripes or checks were found to be equal in attraction. [For previous parts, see this *Bulletin*, 1952, v. 49, 196, 322, 323.] *Anne Hudson*

See also p. 504, BAILEY & BOHART, **A Mosquito Survey and Control Program in Guam.**

BARBOSA, F. A. S. Novos subsídios para o conhecimento dos *Culicoides* neotrópicos (Diptera : Heleidae). [**New Observations on Neotropical Culicoides**] Recife. 1952, 21 pp., 10 pls. [12 refs.] [Thesis.]

The English summary appended to the paper is as follows :—

" Two new species and a new variety of *Culicoides* (Diptera : Heleidae) are described. Several new records are reported from Brazil, Argentina, Bolivia and Ecuador.

" *C. leoni* n.sp., *C. alahialinus* n. sp. and *C. debilipalpis equatoriensis* n. var. were collected in several places in Ecuador. *C. recifei* Barbosa is considered to

be a valid species and not a synonym of *C. insignis* Lutz as was stated by Ortiz (1950)."

GRAY, H. E. **Insects observed at Sea.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1081.

A U.S. naval vessel anchored some 22 miles from Virginia Beach, Virginia at 5 p.m. one evening in August 1952. Soon afterwards large numbers of *Musca domestica* appeared. Next day, no flies could be found on thorough inspection ; the ship was extremely clean and there were no strong offshore breezes. There were very few ships in the immediate area, which was 20 to 40 miles from land.

On anchoring next evening the flies reappeared and by 6 p.m. were sufficiently numerous to cause comment during the evening meal. Next morning, they had disappeared again : but several *Diabrotica undecimpunctata howardi* and two *Chrysops* were seen. The appearance of insects so far from land and without supporting breezes suggests that some of them have " much more flight stamina than has normally been accorded to them ". *H. J. O'D. Burke-Gaffney*

BARNHART, C. S. & CHADWICK, L. E. **A " Fly Factor " in Attractant Studies** *Science.* 1953, Jan. 30, v. 117, 104–5, 1 fig.

This is a preliminary note describing experiments from which it is concluded that the visitations of flies (*Musca domestica*) to baits (boiled white corn meal alone, and with " Diamalt " added as an attractant, and proteose peptone in water) enhance the attractiveness of the pabulum, resulting in a progressive increase in the numbers of flies visiting it as time goes on. An extract of flies, soluble in 95 per cent. ethanol, is reported to be attractive to flies but it is not claimed that it is the substance concerned in the experiments. Further work is in progress.

[The results justify the conclusion of increased attractiveness with the visitations of flies. A case for some intrinsic attractive factor common to all flies of this species does not, however, appear to be established. The baits were tested against a wild population of some 50,000 flies near a dairy barn. Presumably, these flies had previously visited and fed on natural substances of considerable attraction to them. Their regurgitations and other deposits on the test baits (particularly the control of non-attractive, non-repellent boiled corn meal) could well be sufficient to amplify the initial attractiveness of these experimental baits. There would seem need to test the phenomenon with laboratory-bred flies having no previous experience of food substances. The paper does not indicate if the ethanol extract was from flies of the same wild population or from flies from some other source.] *D. S. Bertram*

ROTH, A. R. & HOFFMAN, R. A. **A New Method of Tagging Insects with P^{32}.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1091.

" Tagging " insects with radio-active phosphorus is usually done by feeding the larvae or the adult on the radio-active substance. The present note reports attempts to mark " flies and mosquitoes " by spraying them with radio-active phosphoric acid in closed chambers. This proved unsatisfactory even when a wetting agent was used. Successful results were obtained by dipping adult *Musca domestica* and *Phormia regina*, anaesthetized by carbon dioxide, for 10 to 60 seconds in solutions containing 5 to 12·5 μc. of P^{32} per ml. ; a wetting agent improved the up-take of the radio-active phosphorus. This appeared to be wholly superficial ; vigorous prolonged shaking of treated flies in water could remove the radioisotope and dissected organs showed little or no radio-activity. In one test radio-activity was detected for 18 days after dipping for 60 seconds. *D. S. Bertram*

Gersdorff, W. A., Nelson, R. H. & Mitlin, N. **Sulfoxide and 3,4-Methylenedioxybenzyl *n*-Propyl Ether in Pyrethrum and Allethrin Mixtures as House Fly Sprays.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 905–8.

The effectiveness of 2 synergists on the knock-down and insecticidal powers of pyrethrins and allethrin was investigated with house-flies ; the turntable apparatus usually employed by Gersdorff [this *Bulletin*, 1953, v. 50, 352] was used. The synergists were : *n*-octyl sulphoxide of isosafrole (commonly known as "sulphoxide") and 3,4-methylene dioxybenzyl *n*-propyl ether (referred to as benzyl propyl ether). The flies were sprayed by different concentrations of each synergist, pyrethrum and allethrin, separately and by 5 : 1 mixtures of synergist and insecticide. The resulting mortalities were analysed statistically and appeared to give parallel probit-log concentration regression lines. It was therefore possible to calculate the insecticide equivalent of each mixture, and on this basis their relative potencies could be assessed. The enhancement of toxicity in each case was as follows : pyrethrum plus sulphoxide × 10·8 ; pyrethrum plus benzyl propyl ether × 1·83 ; allethrin plus sulphoxide × 2·3 ; allethrin plus benzyl propyl ether × 1·4. It was found then that sulphoxide was the better synergist and that pyrethrum responded better than allethrin to both synergists. As regards knock-down, a careful examination of the results shows that both synergists very slightly reduced the percentage down in 20 minutes. *J. R. Busvine*

Bouvier, G. Notes sur les Tabanidés de la région de Campinas (Estado S. Paulo)—Brésil. [**Notes on the Tabanids of Campinas Region, São Paulo, Brazil**] *Mem. Inst. Oswaldo Cruz.* 1952, Mar., v. 50, 581–96, 3 figs.

This is a report on collections of tabanids made over 2 years in about 80 journeys mostly on foot or horseback, over a part of Brazil 165 km. from the coast, and about 600 metres above sea level. A cold, dry winter lasts from May to about September ; rainfall is heaviest between December and April. The terrain comprises forest, including gallery-forest, pasture-land, sugar cane fields and marshes. Cattle, horse, mule, pigs and man are available as hosts to the tabanids. Despite abundant hosts tabanids were not very numerous, except for some days when, in the forests, *Chrysops* were very numerous. Species of this genus form over 70 per cent. of the flies captured. About 70 per cent. of all the specimens, representing 16 genera and about 40 species of tabanid were taken in the forests. There appears to be only one generation per year for most of the species. Few species are about in winter months.

There are brief descriptions of colours and patterns of markings for most of the species and some biological notes. When a horse was used for transport the catches were improved. Many of the species attacked the rider as well as the horse ; pigs and pigstyes were also attractive to some species. Male flies were taken for only 7 species, including *Chrysops nigroviolaceus* (10 females ; 1 male). This male *Chrysops* was the only one in a catch of nearly 1,800 specimens representing 10 species of *Chrysops*. The males taken of different species were found in forest, at rest on tree trunks, flying above sandy roads, near pigstyes and along river banks. It is not quite certain from the text if the single male *Chrysops* was taken in forest, or in a coffee plantation or near water far from forest ; probably in forest. Males of the *Neotabanus stenocephalus* species-group were sometimes numerous as early as sunrise, and during rain. *D. S. Bertram*

See also p. 545, Wanson & Lebied, Note sur le cycle gonotrophique de *Simulium damnosum*. [**Note on the Gonotrophic Cycle of** *Simulium damnosum*]

See also p. 543, Lewis, *Simulium damnosum* **and its relation to Onchocerciasis in the Anglo-Egyptian Sudan.**

Fredeen, F. J. H., Spinks, J. W. T., Anderson, J. R., Arnason, A. P. & Rempel, J. G. **Mass Tagging of Black Flies (Diptera : Simuliidae) with Radiophosphorus.** *Canadian J. Zool.* 1953, Feb., v. 31, No. 1, 1–15, 8 figs. (4 on pl.) [11 refs.]

The title might lead one to suppose that the problem had been solved of how to "mark" large numbers of blackflies (*Simulium* spp.) with radio-active phosphorus. This is, however, not yet certainly achieved on a scale sufficient to demonstrate flight movements and flight range of the adult flies. Nevertheless, the present work is an interesting and promising attempt, both in laboratory and field work, to obtain "marked" flies by exposing the larvae to radio-active phosphorus. From laboratory tests it is established that larvae take up P^{32} in proportion to their volume and that immersion for 24 hours in a small volume of water containing 0·2 μc. of P^{32} per ml. is sufficient to produce radio-active adults. Pupae do not take up the radio-active material to any extent.

In field tests large numbers of larvae were placed in treated water in a galvanized 50-litre tub. The tub was set in the river where the larvae were first obtained. The water in the tub was continuously agitated by the blades of a fan which kept rotating since it was fixed to an axle on which was also mounted another fan, the blades of which were in turn moved round by the flow of the river water itself. Addition of yeast to the water in the tub improved larval survival, and a coating of paraffin wax on the fan-blades and tub greatly reduced their absorption of the radio-active phosphorus. After 24 hours in the tub the larvae were returned to the stream. Some were subsequently detected by counter as far as 520 yards down from the point of return. Although it is estimated that, in two field experiments, about 1,000,000 treated larvae were returned only one radio-active adult (*S. venustum*) was taken on a horse out of 16,000 collected by sweepings near livestock and from vegetation or in traps (these were not very successful, even when carbon dioxide was used in them). This adult was 100 yards from the river. Collecting of adults was limited to about 5 miles from the river.

These disappointing results are discussed. It is pointed out that it cannot be supposed that the adult catches sampled adequately the area over which emergent adults might reasonably disperse. There is need for an effective trapping method before such wide-scale work could be contemplated. Further, the large numbers of treated larvae may not have been sufficient to compensate for natural death rates in *Simulium* larvae, even when untreated. Some 21 species of predatory insects were identified from the presence of radio-active phosphorus in their bodies. — *D. S. Bertram*

Parrot, L. & Durand-Delacre, R. Notes sur les Phlébotomes. LXVI. Sur le mâle de *Phlebotomus mascittii* et sur sa présence en France. [**The Male of *Phlebotomus mascittii* and Its Presence in France**] *Arch. Inst. Pasteur d'Algérie.* 1952, Dec., v. 30, No. 4, 393–7, 2 figs. [20 refs.]

Pringle, G. **The Sandflies (Phlebotominae) of Iraq.** *Bull. Entom. Res.* 1953, Jan., v. 43, Pt. 4, 707–34, 11 figs., 2 maps & 1 diagram. [12 refs.]

During work on the anopheline fauna of Iraq, some collections of sandflies were also made. The species taken were : *Phlebotomus papatasi, P. sergenti, P. alexandri, P. wenyoni* and, of the subgenus *Sergentomyia, S. hodgsoni, S. baghdadis, S. palestinensis* and *S. squamipleuris*. Two new species, *S. mervynae* and *S. sintoni* and two new varieties, *S. dentata mediensis* and *S. theodori babylonica*, are described, with illustrations. Maps show the distribution as observed for all species during the survey in late 1949 and 1950. A table

gives the numbers of females and males taken in 56 localities ; *P. papatasi* occurred in all, *P. sergenti* in 25, and other species considerably less frequently. Another table names the species of sandfly occurring in Iraq, Jordan, Israel, Iran, Syria and the Lebanon and keys to the females and males are given.

Some biological notes are given for some of the species. The distribution of *P. sergenti* supports the view that it is the vector of oriental sore in Iraq. Both this sandfly and the disease are absent from the south. There is a tentative discussion of this in which it is suggested that a consistently high soil-water level, due to poorly draining soil associated with high-level irrigation, domestic waste-water disposal, or springs, is required to give a soil environment suitable for the breeding of the fly ; rodent burrows in urban areas may possibly be important micro-environments.

P. papatasi is distributed from north to south of the country ; it is the common sandfly below 3,000 ft., a severe summer nuisance, and vector of sandfly fever. It is suggested that an essential environmental characteristic for the species is the deep " earth-crack ", a type of soil fissure which is common in Iraq during the very hot, dry summer. At Shatt-al-Arab, the soil of the date-groves is never very dry and fissures do not occur as elsewhere ; this sandfly is then rather uncommon.

A comparison, by charts, of the seasonal abundance of the various species of sandfly in relation to mean monthly temperatures and relative humidities is given. Most species show an abundance chiefly from about early June to late August when temperatures range from 70–75°F. to 100–110°F. and humidities are, between 6 a.m. and 3 p.m., as low as 10–30 per cent.

It is commented that in some townships human dermal leishmaniasis appears to be absent although the canine form occurs. The author has some grounds for suggesting that this might depend on the presence or absence of *P. sergenti* and the very similar species, *P. alexandri*. A table gives measurements for the length of the small third autennal segment of *P. alexandri* (♀—0·141 mm. ; ♂—0·144 mm.) and of the larger corresponding segment of *P. sergenti* ♀—0·24 mm. ; ♂—0·250 mm.). *D. S. Bertram*

Rodriguez M., J. D. Los *Phlebotomus* del Ecuador (Diptera : Psychodidae). I. Consideraciones generales. Descripción de una neuva especie. [**Phlebotomus of Ecuador. I. General Observations. Description of a New Species**] *Rev. Ecuatoriana de Hig. y Med. Trop.* Guayaquil. 1950, July–Dec., v. 7, Nos. 3/4, 20–29, 12 figs. & 1 map on 4 pls.

This is the first of a series of papers on the species of *Phlebotomus* and their medical significance in Ecuador. Collections of sandflies were made in the province of Los Rios which extends from the Andes to the coast ; it is traversed by numerous rivers ; much of it is low-lying and humid ; it includes much virgin forest and swamp, as well as prosperous farm lands and plantations. The dry season extends from May to December and the humid and wet season from January to March. Collections were made in October when day temperatures ranged from 24°C. to 31°C. and the relative humidity was about 80–90 per cent. No catches of *Phlebotomus* were obtained by leaving a fine white cloth tent out at night with a lamp inside and the edge of the walls rolled up from the ground, unless this was placed over the burrow of some small animal. " Thousands " of *Phlebotomus* emerged if the burrow was disturbed with a stick or with smoking paper. Specimens flew out, settled on the wall of the tent or trap, and were collected at once in a chloroform tube. Some specimens were also taken in cocoa or banana plantations and in houses, and were attracted to rotting fruit

fallen from trees. The following species were taken : *P. apicalis*, *P. barretoi*, *P. hamatus*, *P. triacanthus*, and *P. camposi*—a new species, for which the description is given. *D. S. Bertram*

World Health Organization. Technical Report Ser. No. 54. **Expert Committee on Insecticides. Fourth Report.** Geneva, 28 Nov.–4 Dec. 1951. 98 pp., 12 figs. [Refs. in footnotes.] Geneva : 1952, Dec. [5s. ; $0·65 ; Sw. fr. 2·60.]

The primary work of this Committee is the preparation of International Standards for insecticides and the equipment and methods for their use against vectors of disease. The task is a difficult and perennial one, because there are continual additions to the numbers of new synthetic insecticides ; furthermore, extensive experience of new materials and methods is often necessary to decide what points to specify and how to do it.

In this fourth report of the Committee, most of the specifications suggested at earlier meetings have been revised, with the following objects : (i) approval of the simplest possible test, and (ii) adoption of only one test whenever possible for a given property. Also (iii) the tests for quality have been even more closely defined in a series of detailed appendices. The revised specifications deal with DDT, methoxychlor, γBHC, chlordane and certain formulations of DDT and BHC. In addition, there are new specifications for pyrethrins and dieldrin.

In another section, some progress is made with the definition and standardization of aerosols and their dispensers. Satisfactory specifications have been devised for the physical and chemical characteristics of an effective aerosol. Certain difficulties have arisen in devising a satisfactory biological performance test, though a tentative American method is given in an appendix. [This employs the Peet-Grady fly testing chamber, which is too small to allow the use of the aerosol dispersers normally used in practice.] *J. R. Busvine*

i. British Standard 1831 : Part I : 1952. 14 pp. **Recommended Common Names for Pest Control Products.** [2s. 6d.]

ii. McDonnell, C. C. **Insecticide Names. Adopted Common Names for certain Complex Organic Insecticidal and Fungicidal Chemicals . . . approved for Labels under Federal Insecticide, Fungicide and Rodenticide Act.** *Soap.* New York. 1953, Jan., v. 29, No. 1, 127–31, 137.

In recent decades a large number of complex organic compounds have become widely used for controlling various pests in agriculture, industry, medicine and veterinary practice. The chemical names of these substances have been in many cases, too complicated for general use, and shortened forms and trade names have been devised. Very often a series of initial letters or numbers have been used, leading to a confusing multiplicity (*e.g.*, DDT, BHC, 2,4–D, 2,4,5–T, DNC, etc.) ; furthermore, several terms may apply to the same compound.

To simplify this problem, committees were set up independently in Britain and in the U.S.A. to recommend suitable common names for pest control products.

i. The British Committee was set up under the aegis of the British Standards Institution, who provided the secretariat, and was widely representative of interested bodies. A Commonwealth liaison officer was present and every effort was made to keep in touch with the American committee. The first published list is now available and further lists may be expected.

The common names chosen refer, whenever possible, to a definite compound, not to a grade or formulation. In devising new names, initial letters and numbers are avoided in favour of short words, indicating as far as possible the chemical nature of the compound. However, a few designations such as DDT, BHC and DNC were considered to be too well established to alter. In this first list names of 13 insecticides, 5 fungicides and 9 herbicides are given. In addition to the approved common name, alternative systematic chemical names are given (headed by one approved by the Chemical Society of London). Also structural formulae, other names (excluding proprietary ones) and a few notes are included. The list should prove valuable to anyone dealing with insecticides, whether a scientist or layman.

ii. Dr. McDonnell has compiled a list of common names approved by the Committee on Insecticide Terminology of the American Association of Economic Entomologists. These approved names may be used on labels of products subject to the U.S. Federal Insecticide, Fungicide and Rodenticide Act. There are 53 headings in this list, 46 concerning insecticides and 7 for fungicides. A closer examination shows that it is much more complicated and less consistent than the corresponding British list. Thus, only 11 of the insecticides and 6 of the fungicides are actually approved. Of the remainder, 9 are commercial names and the others are " interim designations that may be used until approved names have been established ". The approved names are certainly satisfactory and in many cases were adopted by the British Committee ; but the other designations range from long chemical words (*e.g.*, *p*–Chlorophenyl *p*-Chlorobenzenesulphonate) to code letters and numbers (*e.g.*, E–1059). Both of these forms perpetuate some of the difficulties we are trying to avoid.

J. R. Busvine

Médecine Trop. 1952, v. 12, No. 7, 793–980, numerous figs. [92 refs.] Les insecticides de contact. [**Contact Insecticides**]

The symposium which takes up the whole of this issue of *Médecine Tropicale* is divided into 5 sections. Part I gives general chemical and physical data about the newer insecticides ; DDT gets 32 pages and BHC 13 pages, while the most recently introduced compounds dieldrin and aldrin receive only a short paragraph each. The second section of this publication gives short notes on the carriage of disease by arthropods, followed by illustrated life histories of a variety of vectors. Section III is rather vaguely entitled " Practical studies on contact insecticides " ; in fact, it is largely concerned with formulations used in the field, with some notes on differential susceptibility, acquired resistance, contact repellency, etc. Part IV gives practical details for using DDT or BHC against various pests, *e.g.*, lice, bugs, mosquitoes, flies, tsetse, etc. This section includes samples of encouraging statistics, showing the beneficial results of insecticides used to combat malaria and yellow fever. The final section provides some interesting comparative statistics on the costs of various schemes involving the use of insecticides against disease vectors (mainly of malaria) together with further data on the results achieved.

Considering the publication as a whole, one notes that it is addressed to doctors and pharmacists in isolated tropical territories of the French Union. It is to be hoped, however, that such people would be reasonably informed on the biology of disease vectors, so that Section II seems redundant. It is likely that a compilation of information on insecticides would be useful, but surely the provision of data on DDT is long overdue. Having waited so long, the authors might have devoted more attention to the latest and most promising compounds, especially dieldrin. Nevertheless, in the presumed absence of alternative handbooks on insecticides in French, this may be recommended.

The confidence one might have in the accuracy of detail in this work is somewhat shaken by numerous mistakes in the spelling of authors' names. [The abstracter has a personal grudge in being referred to as " Bushvinek ".]

J. R. Busvine

Smith, W. T., Jr. & Ryan, J. W. **Some Ester Analogs of DDT.** *J. Amer. Chem. Soc.* 1953, Feb. 5, v. 75, No. 3, 749–50.

Tendeiro, J. Ixodídeos da Guiné Portuguesa. *Hyalomma savignyi* Gervais 1844. [**Ixodidae of Portuguese Guinea.** *Hyalomma savignyi* **Gervais 1844**] *Bol. Cultural Guiné Portuguesa.* 1949, Apr., No. 14, 319–34, 1 fig. English summary.

da Fonseca, F. & Aragão, H. Notas de Ixodologia. II. Uma nova espécie do gênero *Amblyomma* e uma novo espécie do gênero *Ixodes* (Acari Ixodidae). [**Notes on Ticks. II. A New Species of** *Amblyomma* **and of** *Ixodes*] *Mem. Inst. Oswaldo Cruz.* 1952, Mar., v. 50, 713–26, 5 figs. (2 coloured on 2 pls.) English summary.

Aragão, H. & da Fonseca, F. Notas de Ixodologia. III. Confirmação de *Ixodes aragãoi* Fonseca, 1935, de *Ixodes amarali* Fonseca, 1935, e lista das espécies do gênero *Ixodes* que ocorrem no Brasil (Acari, Ixodidae). [**Notes on Ticks. III. Confirmation of** *Ixodes aragaoi, Ixodes amarali* **and List of** *Ixodes* **Occurring in Brazil**] *Mem. Inst. Oswaldo Cruz.* 1952, Mar., v. 50, 727–8, 2 figs. English summary.

da Fonseca, F. & Aragão, H. Notas de Ixodologia. IV. Considerações sôbre a nomeclatura de algumas espécies do gênero *Amblyomma* do Brasil e países limítrofes (Acari : Ixodidae). [**Notes on Ticks. IV. Nomenclature of Some Species of** *Amblyomma* **in Brazil and Neighbouring Countries**] *Mem. Inst. Oswaldo Cruz.* 1952, Mar., v. 50, 729–31. English summary (8 lines).

Eddy, G. W. **Effectiveness of certain Insecticides against DDT-Resistant Body Lice in Korea.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1043–51.

After the discovery of DDT-resistant lice in Korea [Hurlbut *et al.*, this *Bulletin*, 1952, v. 49, 565], the author went out to that country to investigate the problem. All the body lice used in his tests were collected in Koje-do Island, mostly from prisoners of war and, according to his observations, all samples of these lice showed about the same degree of resistance to DDT. On the other hand, specimens of head lice, collected from the same men, were normally susceptible. A variety of different insecticides and combinations of them were tested for effectiveness against the resistant body lice. Tests of individual compounds were made by impregnating pieces of cloth with acetone solutions of various strengths and exposing batches of the lice on these cloths for 24 hours at approximately 30°C. The lowest concentrations giving 100 per cent. kill were as follows : DDT and methoxychlor>1 ; DDD, 1 ; allethrin, pyrethrum, and toxaphene 0·1 ; chlordane, 0·01 ; *gamma* BHC, 0·005 ; aldrin and dieldrin 0·001. Of these substances, dieldrin, aldrin, toxaphene and chlordane were excluded from practical trials because of their toxicity to man. It was also observed that comparatively little was known of the toxicity of *gamma* BHC, but it would appear to be quite safe at an effective concentration. Most of the persistence tests and practical trials were accordingly done with pyrethrum, allethrin and a few with *gamma* BHC.

Laboratory tests of the persistence of various mixed powders indicated that a satisfactory formula should contain about 0·2 per cent. pyrethrum and

similar concentrations of allethrin, together with 2 per cent. synergist and a small quantity of anti-oxidant. Similar good results were obtained with 0·5 to 1 per cent. *gamma* BHC. Cloths treated with these powders gave 95–100 per cent. kill after a week and 50–80 per cent. kill after a fortnight.

Several of the pyrethrin and allethrin powders were tested practically on groups of naturally infested men, who were kept segregated as far as possible after treatment. The results were judged by preliminary and subsequent counts of lice on the underwear of the treated men. It was observed that the powders were more effective when applied by hand than by a powder duster. The results showed good reduction(about 95 per cent.) after one treatment, but the infestation tended to build up (? from hatching nymphs) unless checked by further applications. In the trials there was almost complete eradication of lice with 3 treatments at weekly intervals ; but as a recommendation for dealing with heavy infestations in the field, 4 treatments at intervals of 5 days are suggested, followed by weekly applications if these are unsuccessful. *J. R. Busvine*

BERNDT, W. L. **The Chicken Mite attacking Children.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1098.

This note records the fact of children in South Dakota having been bitten by mites identified as *Dermanyssus gallinae*. The mites were traced to sparrows' nests, under the eaves of the house, whence they migrated *via* a window sill to the children's playroom. The bites were painful, but no dermatitis resulted.
H. J. O'D. Burke-Gaffney

LABORATORY PROCEDURES

FREEDMAN, L. **Some Observations on Intestinal Parasites of Man and their Diagnosis.** *J. Trop. Med. & Hyg.* 1953, Mar., v. 56, No. 3, 49–53. [12 refs.]

This is a general discussion on the diagnosis of diseases due to intestinal parasites and the need for the ordinary physician and pathologist to be aware of the possibility of meeting them today in widely distributed areas outside the tropics.

The author, whose work and that of his colleagues in Durban will be familiar to readers of this *Bulletin*, gives practical information on the taking and preparation of faecal specimens, the importance of noting the physical and chemical characteristics of stools and of studying the macroscopic appearance and numerical incidence of some of the helminths. The difficulties in recognizing some helminthic ova are mentioned and there are several observations on the recognition of amoebae and their cysts. The paper also includes reference to staining methods for protozoa, concentration methods for examining stools, and the importance of keeping a look out for coccidial parasites.

This paper should be of practical value to those without special training in intestinal parasitology, who require guidance in the examination of stools.
H. J. O'D. Burke-Gaffney

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

RHODESIA, SOUTHERN. DEPT. OF HEALTH. **Annual Report of the Nutrition Council for 1952** [JONES, E. B., Exec. Officer]. 6 mimeographed pp. [1953]

The main health problem of Southern Rhodesia is stated to be "the malnutrition of the African population. The remedy for this is neither medical

services nor increased maize production but a sound food and nutrition programme based on the results of a survey." Both pellagra and kwashiorkor are widespread among the Africans. The Council's application for a field staff to carry out an assessment of the problem has been repeatedly turned down and precise knowledge of the extent of these diseases and of the food consumed in the various parts of the Colony is unknown.

Tempe, a soya-bean product prepared according to Indonesian methods, and tortilla, a dry flat thin maize cake prepared according to Mexican recipes, have been shown to be nutritious foods, which could easily be prepared on a large scale in Rhodesia. Both are palatable and acceptable to Africans, when served with suitable relishes. The widespread use of these foods, new to the country, might greatly improve the health of the people. [This report describes the work of an enthusiastic small council of two persons ; their proposals seem fundamental to the development of the health and prosperity of the people of Southern Rhodesia, and the report ought to be disturbing and promote enthusiasm.] *R. Passmore*

Bolivia : Ministerio de Higiene y Salubridad. División de Endemias Rurales. Organismo mantenido por cooperacion entre el Gobierno de Bolivia y la Division Sanitaria Internacional de la Fundacion Rockefeller. Informe Anual 1951. 39 pp., 7 maps. 1952. La Paz-Bolivia. [**Annual Report for 1951 of the Organization for Co-operation between the Bolivian Government and the International Sanitary Division of the Rockefeller Foundation**]

This report is divided into 7 sections, with a brief introduction. The diseases of which accounts are given are yellow fever, malaria, plague, typhoid fever and hookworm, a section on prevention of typhoid fever and on vaccination against smallpox and, finally, one on administrative matters.

During 1951 there were only 3 cases of *yellow fever* in Bolivia, all of the sylvatic type and all confirmed by the pathological state of the liver, and transmitted by *Haemagogus*. A fourth patient, a child, was at first thought to be suffering from yellow fever, but was proved to be an instance of poisoning by carbon tetrachloride given as a vermifuge. During the year the Viscerotomy Service collected 344 specimens of liver, and 10,454 houses in 65 localities were inspected for *Aëdes aegypti*. In 25,327 houses 380,086 water collections were noted ; nearly 18,000 were treated with DDT and nearly 16,000 were obliterated. The plan of 4-year vaccination of all those living below 1600 metres was continued, and 51,339 were vaccinated in 571 localities.

Malaria prevalence in Bolivia varies from year to year ; in 1951 it was high, in fact, it is said to have been one of the " malaria years " which occur approximately every 5 years. Smears of blood from suspicious cases to the number of 12,310 were examined at the laboratory ; 632 were positive ; 426 showed *P. vivax*, 176 *P. falciparum*, 84 *P. malariae* and 54 showed mixed infections [these total 740]. Spleen and blood indices are given for a large number of localities (more than 120), the table stating the year when control measures were started, the indices before this and for the years 1950 and 1951.

Plague exists in a narrow area from the Province of Ichilo in the Department of Santa Cruz down to the Argentine border. In the southern parts sylvatic plague (occasionally attacking man) exists among rodents, notably *Oryzomys stoltzmanni*, and infecting this the common fleas are *Rhopalopsylla* and *Craneopsylla*. Two outbreaks have occurred during the year, the first in February at El Pincal, the second in November in Las Pampas de Mojocoya, both in Chuquisaca Department. *Xenopsylla cheopis* was very rare, only 7 specimens being found. In El Pincal a boy of 6 years was attacked and plague rats

harbouring infective fleas were found of the species mentioned. In Pampas de Mojocoya there were 9 cases, 4 confirmed by laboratory examinations. Six patients died before the plague epidemiological unit arrived ; 3 recovered. The outbreak started in La Poza where 7 of the 9 cases occurred. The rats identified were *Phyllotis wolffsohni* and *Hesperomys venustus* and both species were found infected. Of the former 102, of the latter 80 were caught and the fleas found on them were *Neotyphloceras crassispina* (76), *Hectopsylla* (34), *Craneopsylla* (26), *Pulex irritans* (15), *Tunga penetrans* (3). Other rats sent in for identification were *Rhipidomys callinus* and *Protechimys guayannensis securus*. The team inspected 19,151 houses and found traps or poison laid down in 9,795 ; they placed traps or poison in 5,045 burrows and laid 72,919 snares (*trampas*). The authors give the numbers of rats caught, both sylvatic and domestic, the number of fleas examined and the numbers of cultures from fleas on rats and man and from rat tissues.

Hookworm infection is one of the most widespread and serious in the country and fluctuates between 85 and 94 per cent. of the persons examined (rather less in Santa Cruz). Among 12,176 examined, only 3·6 per cent. were free of intestinal parasites ; 33 per cent. harboured only one species, 64 per cent. two or more. *Ascaris* and *Trichuris* came next in frequency. Of the 12,176 there were 9,827 (81 per cent.) with hookworms, 6,156 (51 per cent.) with *Ascaris* and 5,954 (49 per cent.) with *Trichuris* ; *Taenia saginata* was present in 139 (1·14).

Typhoid fever.—Thirty-six cases were recorded during the year, all confirmed by serological reactions ; 24 in the town of Paz, 3 in Chayanta Province in August, 3 in Caracolla, north of Oruro, in November, 2 in La Florida in October and one each in 4 other places, 2 in February and 2 in September. Of the La Paz cases 10 occurred in January, 11 in February and one each in August, November and December. Eight of the January cases were in troops quartered in the city. Of 318 samples of blood sent to the laboratory for serum reactions 30 proved positive, 8 doubtful and 280 negative.

Anti-smallpox vaccinations and revaccinations during the year numbered 25,853 (only 4,157 in 1950). Of 17,016 whose results are noted, 7,392 (43·4 per cent.) were first vaccinations, 5,843 (34·4) gave an accelerated reaction, 3,252 an immunity reaction (19·1) and 529 (3·1) yielded no result ; it is clear that there are many non-immunes.

H. Harold Scott

Floch, H. Rapport sur le fonctionnement technique de l'Institut Pasteur de la Guyane Française et du Territoire de l'Inini pendant l'année 1951. [**Annual Report of the Pasteur Institute of French Guiana and Inini for 1951**] *Arch. Inst. Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 262.* 1952, 310 pp. [Refs. in footnotes.]

This report contains the usual full and detailed account of the work of the Institute for the year. There are 6 chapters. The first is a general introduction and includes an account of the Pan American Conference on Leprosy held in Buenos Aires in 1951, and relevant subjects. The second and third chapters deal statistically with the large and varied volume of work undertaken : it is noted that in all 73,910 investigations were carried out of which nearly 25,000 were medical and over 47,000 entomological and zoological. The fourth chapter deals with the individual pathological conditions encountered and the various laboratory investigations of them.

The fifth chapter, which occupies over 200 pages, is concerned with research and published work. Over 50 pages are devoted to leprosy and nearly 30 to anti-malaria work. The studies include such subjects as yellow fever, tetanus and quinine injections, leptospirosis, dysenteries, schistosomiasis, rabies

leishmaniasis, filariasis and histopathological studies. There are 20 pages on food and nutrition and 11 on entomology. A few pages are given to veterinary pathology and to snakes.

The list of publications by members of the Institute covers 5 pages and there is finally a short chapter on vaccines, sera and biological products.

Most of the information contained in the Report has already been reported either in the well-known Publications of the Institute or in the general medical press. As such, most of it has already been abstracted in this *Bulletin*. It is however extremely valuable to have this wealth of information on so many subjects dealt with by the Institute under a single cover.

H. J. O'D. Burke-Gaffney

VERHAEGEN, P. Considérations sur la tension du liquide céphalo-rachidien chez le noir du Congo. [**Observations on the Pressure of the Cerebrospinal Fluid in Africans in the Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1952, Dec. 31, v. 32, No. 6, 693–8.

The author states that the conclusions reached by MIHAIL and LOTTE [this *Bulletin*, 1953, v. 50, 149] as to the pressure of the cerebrospinal fluid of Congo Africans are entirely contrary to his own. Among other things stature and position affect the pressure. With proper corrections and adjustment of these he has checked the pressure of the cerebrospinal fluid of 20 Africans with a Claude manometer and found it in no way to differ from that of Europeans resident either in the temperate zones or in the tropics. *A. R. D. Adams*

MARETT, W. C. **Some Medical Problems met in Saudi Arabia.** *U.S. Armed Forces Med. J.* 1953, Jan., v. 4, No. 1, 31–8.

The author was a U.S. Air Force base surgeon at Dhahran Air Field, Saudi Arabia, in 1948–1949. He describes the medical organization, the means of dealing with diseases encountered, the problems of transport and gives a general account of the country and its living conditions and diseases.

The kingdom of Saudi Arabia comprises about four-fifths of the Arabian peninsula and has no lakes or rivers, although there is plenty of artesian water. It is stated to be " probably the hottest and driest country in the world ". From May to September the temperature averages well over 100°F. with frequent peaks of 120°F. or more, but in November to March, the climate is pleasant. Sandstorms are frequent and a graphic description is given of their effects and of the extreme difficulties of communications and transport in the desert. Heat exhaustion was a problem, but was overcome by the use of salt tablets in the case of the airmen.

There is a population of some 6 million, living largely in conditions of primitive sanitation, and doctors are few. Flies and mosquitoes are abundant and the incidence of malaria is extremely high. It is stated that almost all the population has malaria at some time or another and the spleen and parasite rates are reported to be " as high if not higher than any place else in the world ".

Smallpox is also common and vaccination irregular. There were not many severe epidemics of smallpox, but some of them might kill hundreds in a single village. Tuberculosis is common and control measures are inadequate. There is much trachoma and many blind Arabs are seen. Other diseases frequently encountered were syphilis, brucellosis and the common parasitic diseases. The author saw little leprosy and no epidemic of typhus or cholera.

There is a disturbing account of the procedure in which, under the local system of justice, chronic offenders are punished by suffering the loss of a hand or foot. Although medical assistants from the neighbouring oil company

are now allowed to treat the wounds thus inflicted and the victims may receive surgical attention in hospital, they often flee and the mortality from haemorrhage and infection must be high.

Fresh vegetables for the American forces were flown from Eritrea, as the few local vegetables were raised in insanitary conditions. The biggest problem in regard to the members of U.S. forces was mental health, because of the intense heat, isolation and meagre recreational facilities. Venereal disease was not a problem because of the absence of opportunities of contracting it: but there were some cases in men who visited Bahrein Island, on the Persian Gulf. In the cooler months, there was an increased incidence of upper respiratory diseases.

The author describes the measures taken to look after the U.S. airmen and the medical assistance given to the Arab sick. The measures followed conventional lines and appeared to be successful. *H. J. O'D. Burke-Gaffney*

Loures, J. de C. & Bastos, A. F. Resultado e considerações sôbre 250 exames de fezes. (Parasitoscópico e bacteriológico.) [**Results and Notes on 250 Bacteriological and Parasitological Examinations of Faeces**] *Hospital.* Rio de Janeiro. 1952, Oct., v. 42, No. 4, 507–22. [11 refs.] English summary.

This paper records parasitological and bacteriological examination of faeces on 250 specimens taken from patients coming from different parts of Brazil. The results are shown in several tables, and include the finding of *E. histolytica* in 26·8 per cent. of cases, *Giardia* in 8·8 per cent., *Chilomastix* in 8 per cent. and *Ascaris* and *Necator* in approximately 3 per cent. each.

Among 173 bacteriological examinations made, it is noted that *Salm. typhi* was isolated twice, *Salm. paratyphi B* once, unidentified salmonellae and *Proteus* 14 times each and shigellae twice. *H. J. O'D. Burke-Gaffney*

Mackey, J. P. **The Host-Parasite Relationships between Man and his Tissue Invasive "Parasites" in East Africa as a Basis for Medical Policy.** *East African Med. J.* 1953, Jan., v. 30, No. 1, 13–41. [55 refs.]

"An attempt has been made to describe the host-parasite relationships between the East African and his tissue invasive parasites. Present day relationships are to be explained on immunological and genetic principles and by the use of an evolutionary approach. Perfect relationship is the result of an ancient evolutionary selective process on both host and parasite but especially on the latter. Such relationships are only likely to be seen today in hosts of the same genetic make up and living under the same conditions as those which pertained during this selective process.

"A review of the relationships of *P. falciparum*, hookworms, *Ascaris lumbricoides*, schistosomes, *W. bancrofti* and *A. perstans* with man is given. In the course of this review certain factors concerned with good host-parasite relationship emerged. Where these factors are lacking, poor host-parasite relationships, followed by tissue reactions and disease, result. These observations may thus be used as a basis for preventive and clinical medical policy. An attempt to formulate such a policy has been made. It is considered however that further research into these host-parasite relationships is long overdue.

"Two other host-parasite relationships tend to remain imperfect under any conditions. These are human trypanosomiasis and onchocerciasis. An explanation for these imperfect host-parasite relationships is given."

[This is an exceptionally interesting, stimulating and well documented study, which does not lend itself to further summarization and which should be read in the original by those who are interested in the subject.] *R. M. Gordon*

MÉTRAUX, A. Médecine et vodou en Haïti. [**Medicine and Voodoo in Haiti**] *Acta Tropica.* Basle. 1953, v. 10, No. 1, 28–68.

HADDOW, A. J. **Field and Laboratory Studies on an African Monkey,** *Cercopithecus ascanius schmidti* **Matschie.** Reprinted from *Proc. Zool. Soc. London.* 1952, v. 122, Pt. 2, 297–394, 18 figs. & 4 pls. [Numerous refs.]

Dr. Haddow, as one of a team of investigators at the Virus Research Institute, Entebbe, has played a large part for over 10 years in the tremendous amount of field-work which has been required to unfold the facts about the relationship of monkeys, mosquitoes and man in rural yellow fever of East Africa. The Redtail monkey, *Cercopithecus ascanius schmidti*, has been shown to be of particular importance as an intermediary between the reservoir of the virus in forest monkeys and the African in his nearby villages and plantations. It is a common species of monkey and an inveterate raider of crops. And it is during these raids that plantation mosquitoes, whose usual host is man, may feed on infected monkeys, acquire the virus, and subsequently transmit it to the African. The present paper brings together and discusses a substantial amount of information which Dr. Haddow has carefully recorded about this monkey throughout the past 10 years or so.

A sample of 82 males and 61 females of the Redtail forms the basis of the first quarter of the paper, which after clarifying systematic points and some difficulties in synonymy, goes on to describe, with excellent illustrations by the author, the external features, cranial characters, dentition, and so on of the animal. Sizes and weights and other details are presented by tabular and graphic means and discussed with references to the difficult matter of estimating the age of a specimen—a point of some importance in determining the distribution of virus infection in a monkey population. Definitions are given for the following age-groups : *infant* (birth to 6 months) ; *juvenile* (6 months to about 1½ years) ; *subadult* (about 1½ to 3 years) ; *adult* (about 3 to 10 years) ; and *old* (about 10 to perhaps 20 years). Most of the monkeys were shot, the Redtail being difficult to catch or trap. There is a valuable account of methods used and equipment required for the work, which can rarely be done under conditions best suited to easy recording of data. The distribution of the Redtail in Africa, and in Uganda, is illustrated by maps.

Having dealt with morphological characteristics, the paper turns to consider the Redtail as a living creature of the forests. This is preceded by an account of differences in postures of numerous species of monkey which are essential for the recognition of the Redtail when its rufous tail, white nose and cheeks are obscured by foliage, poor light, activity and so forth. Differentiation of the calls of different kinds of monkey is also helpful in the field.

Redtails feed during the morning and again in the late afternoon, sometimes until after dusk ; they usually feed in small bands of about 10 or so individuals. Exceptionally, they may occur in much larger bands. This has been noted in raids on plantations and when some particular tree was in an attractive phase of fruiting. Solitary monkeys, of either sex, are not unusual, nor are bands of mixed species of monkey. The Redtail rarely feeds at ground-level ; stomach contents are usually composed largely of leaves and green-shoots, but certain fruits, the flowers only of *Markhamia*, and the gum of *Acacia*, are also eaten. This monkey does not seem to crack open large kernels although it may hold

them for flavour in its cheek pouches. Cultivated crops detected in the stomachs were maize, banana, pineapple, passion-fruit, pumpkin, millet seed, and tubers of sweet potato and cassava. Redtail, and other East African monkeys except baboon, have not been observed to drink water in nature. About 1 lb. of food is taken at a meal by monkeys of about 6·5 to 8·6 lb. in weight.

At night, the feeding groups break up into sleeping parties of 4 or 5, or even single, monkeys. They tend to sleep in the lower foliage of high trees or the upper foliage of under-storey trees ; they do not consistently use the same place or tree every night. They settle down often just after dark and are again active with the first weak light of the dawn.

The basis of their social organization still remains rather obscure. Although a male generally assumes responsibility for warning and watching after a band has been disturbed, there is no clear evidence of a system of male dominance based on age, strength, or sexual virility ; nor, seemingly, are sentinels posted during feeding or other activities. Sexual display or activity has not been observed ; it is presumed that mating occurs after dark. There is marked solicitude for the infant, exhibited on occasion even by male adults. Careful consideration of the available information suggests that there is a breeding season for the Redtail, infants being rather more numerous from September to April.

The worst enemy of the Redtail is man, who hunts them for their meat (which is good), skins and to protect crops. Leopard and python are probably not important predators, but the Monkey-Eating Eagle or Crowned Eagle (*Stephanoaëtus coronatus*), at least in Uganda where it is commoner than records suggest, kills considerable numbers.

Detailed pathological studies were hardly practicable, but some account is given of disease and parasites observed or recorded for the Redtail. Traumatic lesions were quite unusual, but include a healed leg fracture, a fractured mandible and a missing hand ; internally, an adult with one kidney is known and, in another, gross abnormality of kidneys associated with hypertrophy of heart, liver and spleen, hypertension and a high temperature of 104·4°F. occurred. From captive monkeys, it would seem that about 8 per cent. die of heart conditions similar to those affecting man. Pulmonary disease was not observed, and only one case of alimentary disease involving adhesions in the caecal region.

Hepatocystis kochi was the common parasite, merocysts occurring in the liver of 36 per cent. of 132 monkeys ; all age-groups were infected, except a few infants. The vector still remains undiscovered. The spleen was frequently abnormal, including a problematical dark pigmentation, perisplenitis of uncertain origin, and extensive histological changes in the spleen tissue. A trypanosome and a piroplasm are recorded in the literature. The author saw few nematode worms and one instance of tapeworm infection and no adult filarioid worms, although microfilariae were seen in liver sections. Trematodes and pentastomids were also not seen. Intestinal protozoa remain to be studied. No fleas, lice, ticks or mites, *Culicoides* or hippoboscids, were discovered or seen on Redtails but several mosquitoes (*Anopheles gambiae, Taeniorhynchus fuscopennatus, Aëdes longipalpis, Aëdes apicoargenteus* and *Aëdes africanus*) and the tabanid, *Chrysops centurionis*, were caught biting this monkey. Other mosquito species are also likely to feed on it.

The paper concludes with an account of yellow fever and several other East African virus infections in the Redtail and other species of monkey, and of the significance of the findings with regard to these diseases in man.

D. S. Bertram

BOOK REVIEWS

VAUCEL, Marcel *et al.* **Médecine tropicale.** [Tropical Medicine] 2 vols. 1950 pp., in loose-leaf binders, 243 figs. & 5 coloured pls. 1952. Paris : Éditions Médicales Flammarion, 22, rue de Vaugirard, VI^e^. [Fr. 12,000.]

The Flammarion edition of medical text-books is unique in that it is produced in a loose-leaf form with revision pages issued each year. Now, two volumes on tropical medicine have been produced under the general direction of Marcel Vaucel, helped by past and present members of the Pasteur Institutes and other workers in France Overseas. Volume I is divided into 3 parts dealing with helminthic, protozoal and spirochaetal diseases respectively. There are numerous illustrations, many of them original, including vivid pictures of epidemiological features from the French tropics, new diagrams of life histories of parasites, histological sections, arthropod vectors (with good stereoscopic effect), etc., and maps showing the distribution of infections. The 5 coloured plates of malaria parasites are taken from a pre-war work, and are not entirely satisfactory (particularly in regard to details of pigment, *P. malariae* gametocytes, absence of schizonts of *P. falciparum*).

The text gives a well-balanced account of each disease ; important diseases are really thoroughly described, about 150 pages are devoted both to amoebiasis and malaria, while the rarer worms may be given only half a page—like *Mansonella ozzardi*. For teaching purposes, this is admirable, and the student can be sure that all important aspects are covered. The general plan is as follows : geographical distribution, epidemiology (including a description of the infective agent, vector, and life history), symptomatology, pathology, diagnosis, prognosis, treatment and prevention, though the plan is modified slightly by each contributor. The bibliography of each subject is given at the end of the chapter and as a rule is confined to work carried out during the last 20 years. Paragraphs are kept exceptionally brief and are separated by triple spacing—this system is probably useful both for learning and reference purposes.

Recent editions of books dealing with tropical medicine or parasitology treat the subjects of the newer insecticides and chemotherapy in separate chapters ; they also tend to have special sections on the vectors of disease. This system leads to much duplication ; it is not followed here, where everything is considered under the one heading, and there is not even an introduction. Nevertheless, these special subjects receive adequate attention, *e.g.*, chemotherapy of malaria is logically presented, firstly in a detailed description of the various anti-malarial compounds, secondly in a clear account of how to treat the different forms of malaria (a) in non-immune, and (b) in partially immune people, and finally chemoprophylaxis. Paludrine [proguanil] is thoroughly discussed, but the book was issued before the daraprim investigations had been published. The subject of drug resistance is considered at some length in the chapter on trypanosomiasis. Drug treatment of leprosy is described in great detail. An exact description of the use of the newer insecticides is given at the end of the prevention section in each chapter.

Volume I contains two particularly useful tables, one giving the differential characters of the human amoebae, the other presenting the epidemiological factors concerned in relapsing fever—the arthropods, spirochaetes, animal reservoirs and countries affected.

Volume II deals with the following subjects—diseases caused by viruses, rickettsiae, bartonella, bacteria and fungi ; nutritional and climatic diseases ; diseases due to arthropods, venomous animals and vegetable poisons ; and a miscellaneous group including toxoplasmosis, tropical ulcer, sickle-cell anaemia, etc.

In this volume, as in the first, various non-tropical conditions are described, a desirable inclusion considering the inadequacy of their presentation in the ordinary textbook of medicine (*e.g.*, amoebiasis, trichomoniasis, rickettsiosis, toxoplasmosis). The rickettsial diseases are discussed in their geographical groups, which for the worker in the tropics is perhaps the most suitable way of dealing with the problem. Classical and murine typhus receive the barest mention, and these infections might well receive fuller treatment in subsequent additions to this volume. There is a particularly interesting chapter on bartonellosis, with a clear-cut account of the probable life history of the organism (progressing from a bartonella, *via Eperythrozoon* to a virus). Although plague is given nearly 100 pages, the subject of the wild rodent form of the disease could well be expanded ; treatment and prophylaxis on the other hand are fully described. Seven useful tables on vitamins and tropical foods are given as an addendum to the chapter on beriberi.

This " Tropical Medicine " is essentially a practical work, it provides exact information with a minimum of padding, and is a most welcome addition to the literature of the subject. *P. C. C. Garnham*

BELDING, David L. [M.D.] **Textbook of Clinical Parasitology.** 2nd Edition. pp. viii+1139, 283 figs. & 4 coloured pls. 1952. New York : Appleton-Century-Crofts, Inc. [90*s.*]

The post-war edition of this book includes the new parasitological developments in tropical medicine which grew so rapidly during and after the war. By re-arrangement of text, the author has managed to keep it little bigger than the original one, and it remains an eminently readable and authoritative textbook on parasitology. The book begins with a useful section on the principles of parasitology and ends with another on technique ; in between are 5 on protozoa (much revised since the first edition) helminths and arthropods. Each of the main sections treats the subject zoologically, but when the species is reached, the medical aspect is emphasized under history, distribution, morphology, life cycle, pathology, symptomatology, treatment, diagnosis, epidemiology and prevention. There are 44 tables and nearly 300 figures, many of which have been redrawn from outside sources. The author's own figures of helminth life cycles are particularly clear, his maps of distribution of parasites are accurate, and his tables are valuable for summarizing existing knowledge. The arthropod vectors of human diseases are included in a single table which occupies 9 pages ; the attempt to tabulate the symptoms of diseases, however, is rather theoretical and perhaps unnecessary. A number of keys relating to the identification of species would have been more useful if they had not been confined to New World species. The subject of toxoplasmosis has now been introduced, and a complete account of the disease is given (unfortunately the section on technique does not include the serological reactions used in diagnosis). In the special chapter on drugs, different screening procedures are given ; and the mode of action of chemical substances is briefly described. This might well have been elaborated, and theories regarding the nature of resistance might have been discussed. The newer drugs—including miracil, hetrazan and paludrine [proguanil]—are then described in alphabetical order. A new chapter has been added on insecticides and repellents ; it has been written very much from the practical angle, and gives useful data about each substance, including its specific use for each arthropod, and toxicity. There is a short section on methods of testing insecticides, but there is little about the important subject of development of resistant strains.

[In a book of this scope written by one man, it is inevitable that some questionable opinions should appear. Patients with acute primary attacks of malaria

are said not to require immediate chemotherapy except when severely ill or comatose, and patients with *Plasmodium vivax* are recommended to have a cold shower-bath or plunge. To describe the destruction of game animals as an "ideal procedure" (even with the qualification "not practical") for the prevention of *Trypanosoma rhodesiense* sleeping sickness is most undesirable ; surely it is time that this immoral practice should be abandoned. Certain aspects of the African forms of onchocerciasis are not up to date : eradication of the black fly *has* been achieved on a large scale both in the Belgian Congo and in East Africa ; the vector of *D. streptocerca* is known, etc.

The author has now given numbers to his references in the text—these are plentiful, and it is easy to run down a particular article in the list of references placed at the end of each chapter.] *P. C. C. Garnham*

EVANS, J. W. [M.A., Sc.D., D.Sc.] **The Injurious Insects of the British Commonwealth (except the British Isles, India and Pakistan) with a Section on the Control of Weeds by Insects.** pp. vii+242, 1 pl. 1952. London : Commonwealth Institute of Entomology, 41, Queen's Gate, S.W.7. [30s.]

The information included in this volume has been extracted from the *Review of Applied Entomology*, both series, A (Agriculture) and B (Medical and Veterinary) from the year 1913 to 1950 and all volume and page references are to this *Review* with the exception of a few titles of original works.

The author does not claim to present any original information or to have included all injurious insects occurring in the area under consideration. He has reviewed the literature of nearly 40 years using the *Review of Applied Entomology* as a foundation.

The book is arranged in 5 parts and most of the text, about five-sixths, is about insect pests of agriculture, horticulture and forestry : the only part which contains any matter of direct interest to workers in the service of medicine and hygiene is the first, which occupies 37 pages. Insects such as those which infest stored foodstuffs and those which occur in houses have for the most part been omitted, as have those of wide occurrence which are parasitic on man and domestic animals.

It contains references to works on insects of medical and veterinary importance occurring in countries in the following territories : Africa, Asia, Australia, Mediterranean Islands, New Zealand, North America and Bermuda, Pacific Islands, South and Central America and West Indies. References to tsetse flies are given in the appropriate regional accounts and then are dealt with more fully at the end of the African section.

The references to first appointments to entomological posts draw attention to the short period during which applied entomology has been practised in some parts of the Commonwealth, and those noted are of Government or Agricultural Entomologists and not medical or veterinary ones.

[The reviewer feels that while this volume forms a very useful short cut to the literature on insect pests of crops of many kinds and thus is of service to the agricultural entomologist, it is somewhat less adequate for the purposes of the medical entomologist, or the medical man interested in entomology, as the relevant literature quoted only tends to take the form of a slightly extended index to certain selected references to the contents of Series B of the *Review of Applied Entomology*, and also because the author, though he has included some insects that affect the health of man and animals, has done so solely for the purpose of providing information of a general reference nature for the benefit of workers in other fields of entomology.]

H. S. Leeson

NATAF, Roger. **Le trachome. Historique—clinique—recherches expérimentales et étiologie—thérapeutique—prophylaxie.** [Trachoma] Préface de A. CUÉNOD. 426 pp., 46 figs. & 17 pls. (16 coloured). 1952. Paris : Masson et Cie., 120, Boulevard Saint-Germain, VI^e. [Fr. 3,700.]

This monograph is based on the author's experience of the clinical, scientific and social aspects of trachoma over a period of 25 years spent mostly at the Pasteur Institute of Tunis. As trachoma is a social scourge which affects hundreds of millions of people in vast areas comprising 3/4 of the globe so doctors, scientists and public health authorities are becoming more and more interested in its investigation.

The book is divided into 15 chapters. The first chapter comprises the definition, generalities and classification of the disease. The World Health Organization in 1948 defined trachoma as a specific and infectious disease of the conjunctiva and cornea producing at some stages cell inclusions (Prowazek bodies) and with a tendency to remain in a chronic state. Its cure is brought about by scar formation in the affected tissues. In 1952 the same organization recommended the basic classification of trachoma into the 4 stages advocated by MACCALLAN, adding for clinical and scientific purposes the signs and symbols appropriate for the case.

The second chapter is devoted to the historical aspects of the disease and will prove most interesting not only to doctors but to the lay public as well. The history is traced from antiquity to the present day in 3 periods—the first up to the end of the 18th century, the second to the end of the 19th century and the third extending from the time of Pasteur up to the beginning of World War II. The third chapter deals with the epidemiology and geographical distribution of the disease. The clinical study is discussed in several chapters : symptoms ; clinical forms ; complications ; clinical, differential and biological diagnosis ; prognosis ; and finally treatment. The medical and surgical treatment of trachoma is described under different headings. Older methods of treatment are not neglected and the more useful ones described. The more modern therapy with the sulphonamides and antibiotics is discussed in detail. The author is of opinion that most of the sulphonamides have an effect on the secondary infections and complications if not on the trachoma process itself. The effects of antibiotics are still in the research stage but it would appear that aureomycin and perhaps terramycin are useful in anti-trachoma therapy. For treatment of trichiasis the combined excision operation, based on the results of 40,000 cases, is advocated as the method of choice.

Three chapters are devoted to the scientific study of the disease—pathological anatomy, aetiology and pathogenesis, and experimental researches. A chapter on the physiopathology of the trachomatous eye is written by Jean SEDAN and deals with an aspect of the disease which has been little investigated. Prophylaxis is discussed under all its aspects—individual, familial, social, national and international.

Finally there is an extensive bibliography of all the more important articles on trachoma written in the last half century. The monograph is illustrated by 16 beautiful coloured plates and 46 black and white drawings, and is indeed a superb book. The author is to be congratulated on its publication. It will be found most valuable to those interested in the study and the research of this disease. *E. W. O'G. Kirwan*

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